



# CHEETAL

**JOURNAL OF**

**The Wildlife Preservation Society of India**

Vol. 43

Dehradun 06(Dec04 to May05)

Nos. 3&4



Paradise fly catcher, male on nest

Photo by : Bhagat Singh





Kanha meadows- Swamp deer herd

Photo- A.S. Negi



*Dendrophthoe falcata* (L.f.) Etting (Loranthaceae)

Photo- A.S. Negi



## Editorial

Shall we be held responsible for handing over the planet earth much poorer in quality of life to our next generation. The global warming, the depletion of ozone layer & enlargement of ozone hole, uncertainty of weather, natural calamities on global scale are warnings enough for ever crazy humans who are in delusion of development & advancement in a world which threatens the very existence of man due to neglect of environment. The shrinking & degradation of forests has devastating effects on humans due to decrease in biodiversity, both floral & faunal. It is now no more a matter of ignorance as the satellite pictures of earth with its depleting forest cover is being analysed by scientists at much smaller intervals than before. It is no more a secret close to the chest of foresters that the decrease in forest cover both in quantity & quality is taking place at alarming rate in most of the third world countries. Large mammals are facing threat due to fragmentation of their habitat & lack of corridors and connectivities & smaller creatures are getting extinct due to high degree of air, water & soil pollution. It may be the creatures in sea or in big & small rivers and lakes or the avifauna in sky or the creeping & fragile fauna on or under the ground, none is safe. Extensive use of pesticides, pollution of underground water by industrial & other effluents is decimating species after species of flora & fauna. Our great scavenging Vulture friends are already at the brink of extinction due to over use of an analgesic drug Diclofenac. In spite of the safe alternative having been developed the blind commercial interests of few are knowingly delaying the use of alternative drug. What has happened to the crows who used to flock around at every party or picnic or where have the large flocks of sparrows & mynas from the rural India vanished leaving only few to be seen. We may be disillusioned that man who is last to evolve would also be the last to vanish but no, with the criticalities of temperature & other weather factors & frequent calamities we could also vanish simultaneously with other fellow creatures.

Shall we allow this to happen sooner or shall we use our wisdom to delay or stop it by changing our way of life & way of thinking. Let us not pin our hopes on the political systems to remedy this. We will have to change the political systems responsible for environmental hazards for their immediate gains. People have changed empires for social injustice now time has come when people should change political systems to bring in the one that will be sensitive to environmental issues and aim at a better quality of life not for ourselves alone but for all the fellow creatures on mother earth.

A.S. Negi.



# CONTENTS

|                                                                                                                         |                                                           |    |
|-------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|----|
| <b>A conservation plea for saving wildlife in the landscape bound by Gola, Ladhiya and Sharada rivers, North India.</b> | <i>A.J.T.Johnsingh, Bivash Pandav and Dhananjai Mohan</i> | 1  |
| <b>Rellocation of villages from Tiger Reserve</b>                                                                       | <i>A.S. Negi</i>                                          | 5  |
| <b><i>A Success Story of Rellocation of 3 villages from Corbett Tiger Reserve</i></b>                                   |                                                           |    |
| <b>Wild Life Preservation in the Doon &amp; Saharanpur Forest Divisions.</b>                                            | <i>M.L. Holdsworth</i>                                    | 11 |
| <b>Some Indian Bird Types Met With in the Deccan</b>                                                                    | <i>RDA</i>                                                | 15 |
| <b>हिम तेन्दुआ <i>Uncia uncia</i></b>                                                                                   | <i>नरेन्द्र सिंह</i>                                      | 18 |
| <b>Seasonal Monsoonal Migration of Ganges River Dolphin in Karnali River and Feeder Streams of Nepal</b>                | <i>Dr. Tej Kumar Shrestha,</i>                            | 24 |
| <b>Avifauna in Some Water Systems of Purulia District, West Bengal, India</b>                                           | <i>R. Chakraborty and S. Kar</i>                          | 35 |
| <b>हिरन परिवार—संक्षिप्त जानकारी व विशेषताएँ</b>                                                                        | <i>ए.एस. नेगी</i>                                         | 41 |
| <b>From the Archives of "Cheetal"</b>                                                                                   |                                                           | 46 |
| <b>Human Aspects in Wildlife Habitat Management in India</b>                                                            | <i>N.K. Sinha</i>                                         |    |
| <b>Cheetal Quarterly News</b>                                                                                           |                                                           | 54 |
| <b>Cheetal Young ReadersSection</b>                                                                                     |                                                           | 62 |
| <b>रामबांस—बहुउपयोगी आर्थिक 'कामधेनु'</b>                                                                               | <i>कु० नेहा चमोली,</i>                                    | 62 |
| <b>What Makes a Bird a Bird?</b>                                                                                        |                                                           | 64 |
| <b>The Fastest Mammals</b>                                                                                              |                                                           | 65 |
| <b>The Largest Mammals</b>                                                                                              |                                                           | 66 |

- 
- \* All the material appearing in this Journal is copy righted and may be reproduced only with permission. Any reproduction in full or in part of this journal must credit the WILD-LIFE PRESERVATION SOCIETY OF INDIA DEHRADUN as the copy right owner
  - \* The views expressed in this journal are solely of the authors and the editor or the Wildlife Preservation Society of India are not in any way responsible for them.
  - \* Article published in "CHEETAL" may be reproduced with due acknowledgement of the source.



## A conservation plea for saving wildlife in the landscape bound by Gola, Ladhiya and Sharada rivers, North India.

A.J.T.Johnsingh\*, Bivash Pandav\*\* and Dhananjai Mohan\*\*\*.

Spreading over an area of nearly 1500 km<sup>2</sup> in the state of Uttaranchal, this landscape includes the Dogari and Boom ranges of Champawat Forest Division (FD), Haldwani and Terai East FDs. Ranges of Champawat FD, just north of Ladhiya river (e.g. Bingrara, Champawat), are not included in this conservation planning. Those who have trekked here would concur with us that the mountainous parts of this landscape (Haldwani and Champawat FDs) are the most beautiful locales in the entire outer Himalayan range. Corbett (1944, 1954) has written about this hilly region in his account on Chowgarh tigers, Chuka and Thak man-eaters. We had the pleasure of walking 130 km across this landscape recently: 60 km from Manch to Thuligad via Chuka and Thak and 70 km from Dalkania (Chowgarh tigers were shot here) to Chorgalia. This landscape was once part of a much wider continuous landscape that existed all along the foot-hills of Himalaya (Toovey 1987).

Based on the recent walks, plus the earlier Terai tiger surveys carried out by the Wildlife Institute of India in this landscape, and the information we gathered from the forest staff during our treks, we conclude that the status of three endangered species - golden mahseer

(*Tor putitora*), elephant (*Elephas maximus*) and tiger (*Panthera tigris*) - is extremely critical here. During our 130 km trek, although we saw seven leopard (*P. pardus*) and five sloth bear (*Melursus ursinus*) tracks, we did not see a single tiger sign.

During the Terai tiger survey, covering all the three divisions, we had walked 147 km along river beds, covering almost all potential tiger forest ranges, looking for tiger, leopard and prey signs. The number of different tiger pug marks seen was 34 and leopard 49 which gives an encounter rate of .23 tiger pug marks/km and .33 leopard pug marks/km respectively. In comparison 18.8 km walk in the four river beds in the southern part of Corbett Tiger Reserve (TR) yielded 21 tiger pug marks (1.1 pug marks/km) and two leopard pug marks (.01/km, Johnsingh *et al* 2004).

Poaching of ungulate prey by the Nepalese and the people of this landscape, as well as outsiders, particularly by the *Rai Sikhs*, is the major reason for the rarity of tiger in this landscape of enormous potential. While poaching by the local people and the *Rai Sikhs* still continues, the illegal activities by the Nepalese have been contained to a great extent since 2003, after the deployment of Special Security Bureau forces along Sharada river.

\*Senior Scientific Advisor, WWF-India and Eminent Wildlife Biologist, Nature Conservation Foundation, Mysore. email id: [ajtjohnsingh@ncf-india.org](mailto:ajtjohnsingh@ncf-india.org)

\*\*Wildlife Institute of India, Dehra Dun - 248 001 email id: [pandayb@wii.gov.in](mailto:pandayb@wii.gov.in)

\*\*\*Wildlife Institute of India Dehradun email id: [mohan d123@rediffmail.com](mailto:mohan d123@rediffmail.com)



Related to tiger conservation, poaching by the *Rai Sikhs* is extremely detrimental as they selectively kill sambar (*Cervus unicolor*), the most vital prey for tiger in the Asian forests, by using dogs and spears. *Rai Sikhs* also indulge in other unlawful activities such as brewing and selling liquor in the forests, and occasionally waylaying villagers who transit through the forests carrying provisions. It is also reported that *Rai Sikhs* are responsible for the killing of most of the elephant tuskers in the area. Exploits of *Rai Sikhs* are largely for adventure and not driven by poverty. Presently, the range and the population of the 40 or so elephants here, one of the most critically endangered sub-populations in the country, are in a depleted state. Other problems seen in this landscape are the widespread presence of cattle camps, use of destructive fishing methods (dynamites, gill nets and bleaching powder) in the Sharada, Nandhour and Ladhiya rivers, smuggling of timber and fire wood cutting along the southern boundary of the landscape.

Yet the potential for the conservation of tiger and mahseer is extremely high, as the landscape has nearly 1000 km<sup>2</sup> intact sambar-tiger habitat, the Nandhour river flows for 30 km through a valley with no permanent human settlements, and the final 20 km of Ladhiya between Chalti and its confluence with Sharada is sparsely populated. The area (Chakata range of Haldwani FD) has a weak connectivity with Ramnagar FD (Fatehpur range) and Nainital FD (Ranibagh range) which are connected with Corbett TR on the west. The connectivity with Corbett TR, broken now, across Terai Central, Ramnagar and Terai West FDs, may be strengthened if the Government takes a firm decision on

banning boulder mining in the Gola river between Gola-Dowli ranges (Haldwani FD) and Tanda range (Terai Central FD). There is connectivity with the forests in Nepal across Sharada, and it appears that the continuity along the foot-hills beyond Sharada exists till the eastern part of Royal Shuklaphanta Wildlife Reserve, a distance of about 20 km. Ground truthing is urgently needed here. The conservation measures suggested would also immensely benefit the elephants pocketed in this landscape, particularly the tuskers would be able to live longer and contribute to breeding. Thus this landscape has immense value in securing the future of tiger and associated species in the *terai-bhabar* landscape which in India and Nepal sprawls over an area of ca. 40,000 km<sup>2</sup>. We present this report to urge the stakeholders to start working towards the following objectives.

- Establish ca. 1000 km<sup>2</sup> Nandhour - Ladhiya Conservation Reserve, which would encompass the Danda, Nandhour and Jaulasal (north) ranges of Haldwani FD, Dogari and Boom ranges of Champawat FD, Jaulasal (south) and Kilpura ranges of Terai East FD and other potential adjacent forest blocks.

- Notify ca. 400 km<sup>2</sup> as Nandhour Valley National Park including areas of Danda, Nandhour and Jaulasal (north), ranges of Haldwani FD as the core of the Conservation Reserve. Danda has human habitations only along its western and northern boundary and Nandhour only in the south. It is reported that Jaulasaul does not have permanent settlements.

- Station a 50-person strong anti-poaching force of forest and police personnel along the southern boundary of the suggested Conservation Reserve, to patrol the forests, kill the dogs used in poaching, arrest the



poachers and liquidate the liquor trade within the jungle. This protection force may have to continue for several years.

- Initiate a dialogue with the elders of the villages all along the southern boundary, from where the *Rai Sikh* poachers are reported to come, so that the men from the villages would stop their illegal activities inside the forests. We should also recruit, motivate and train 12-15 *Rai Sikh* youth from these villages as part of the anti-poaching force. *Rai Sikhs* have a stake in protecting this landscape as water for their prosperous agriculture comes only from these mountains.

- Spread the message of conservation in all the villages within and along the boundary of the Conservation Reserve (this should include villages in the immediate vicinity of Ladhiya on its north bank) about the need to give up poaching, and give sufficient financial incentives to grow fuel wood and fodder species on their lands so that pressures on the forests will be minimal.

- Conduct a socio-economic survey of all the villages in this landscape at the earliest, so that appropriate conservation programmes for every village could be initiated.

- Conduct another absence/presence/abundance survey of tiger, leopard and wild ungulate signs in all the river beds in January-February 2007, as done by Wildlife Institute of India between October 2002 and June 2003 (Johnsingh *et al* 2004), and initiate a study to assess the population, range and habitat use of elephants in the landscape.

- While allowing people to catch fish for their use with line and hook, nooses (a widely used method in this part of India) and cast nets prevent destructive methods of fishing in Nandhour, Ladhiya and Sharada rivers to enable mahseer to stage a come back.

- Secure the support of Government of India, which has the responsibility to save the tiger. Through its recently announced Tiger Conservation Authority, it should support the establishment of the Conservation Reserve and the National Park, which can result in a minimum population of 50 tigers in this landscape. If these recommendations are not speedily implemented within a short span of time, say within three years, it is likely that tigers would become extinct, within a decade or so, in this extremely promising, scenic but so far totally neglected landscape.

### Acknowledgements

Mr. P. R. Sinha, Director, Wildlife Institute of India permitted Dr. Bivash Pandav to go on the Dalkania-Chorgalia trek, Nature Conservation Foundation, Mysore supported Dr. A.J.T. Johnsingh to survey the Manch-Thuligad trail and Mr. Ravi Singh, Secretary General & CEO, WWF-India the survey along Dalkania-Chorgalia trail. Mr. Param Jit Singh, Conservator of Forests, Uttaranchal, Mr. Ashok Mehar, Divisional Forest Officer, Nainital FD, Mr. Kapil Lal, Divisional Forest Officer, Haldwani FD and Mr. Rajmani Pandey, Divisional Forest Officer, Champawat FD and their staff facilitated the treks. Ravikiran Govekar, Maharashtra Forest Department, gave us excellent intellectual company while on the walk from Manch to Thuligad. Drs. S. P. Goyal and Nima Manjrekar read through the manuscript and Mr. Panna Lal and P.K. Tomar, Wildlife Institute of India, prepared the figure. We thank them all.



## References

- Corbett, J. 1944. Man-Eaters of Kumaon. Oxford Universities Press, London.
- Korbett, J. 1954. The Temple Tiger and More Man-Eaters of Kumaon, Oxford Universities Press, London
- Johnsingh, A.J.T., Ramesh, K., Qureshi, Q., David, A., Goyal, S.P., Rawat, G.S., Rajapandian, K. and Prasad, S. 2004. *Conservation status of tiger and associated species in the Terai Arc Landscape, India*. Wildlife Institute of India, Dehra Dun, Pp. viii+110.
- Toovey, J. (ed.), 1987. Tigers of the Raj. Pages from the Shikar Diaries - 1894 to 1949 of Colonel Burton, Sportsman and Conservationist, Alan Sutton.



## Rellocation of villages from Tiger Reserve

### *A Success Story of Rellocation of 3 villages from Corbett Tiger Reserve*

\*A.S. Negi

#### **Geographical Location and Brief History**

Corbett National Park is the first National Park of the Indian Sub continent established on 8<sup>th</sup> Aug. 1936 under U.P. National Park Act of 1934 (An act specially enacted for this particular purpose).

Dhikala and Bugshad Chauras (grasslands) which are now in the core of the National Park were freed from agriculture and cattle as far back as 1861-62. In 1868 the area was handed over to Forest Department for management and it was declared as Reserved Forest in 1871. The idea of establishing a Wildlife Sanctuary in this area was first floated by Sir Michel Keen on 3<sup>rd</sup> Jan. 1907. Sir Malcolm Helley the then Governor General of United Provinces proposed this area for Wildlife Sanctuary in 1934.

Initially the Park was 323.75 Km<sup>2</sup>, which was extended to 520.82 Km<sup>2</sup> in 1966. Timber Operations were stopped in a radius of 5 km. around Dhikala in 1971-72. In 1975 after the filling for Ramganga Reservoir was completed, timber operations were completely banned in the National Park. Fishing as a sport was banned in 1987.

The ambitious conservation project 'Project Tiger' was inaugurated in Corbett National Park on 1<sup>st</sup> April 1973 and at that time it was coterminous with the Corbett

National Park boundaries.

On 11<sup>th</sup> June 1991, Sonanadi Wildlife Sanctuary (301 Km<sup>2</sup>), remaining area of Kalagarh Forest Division (310 Km<sup>2</sup>) and adjoining portions of Ramnagar and Tarai West Forest Division (96.69 Km<sup>2</sup>) were brought under the management of Director, Project Tiger.

#### **Background of Relocation of Villages**

When agriculture and cattle camps were shifted in 1861-62 from Dhikala and Boxar Chauras, perhaps these people were settled on the *Kandi* road now forming the southern boundary of the Corbett National Park. Dhara, Jhima and Kothirao villages must have come in existence around that point of time. *Kandi* road formed the geographical boundary of hills with the plains. When boundary of Corbett National Park was delineated under the guidance of Jim Corbett, care was exercised to keep these villages outside the boundary of National Park to avoid inconvenience to their inhabitants.

The Tarai Bhabar area south of *Kandi* road was then densely forested and there was mixture of grassland and miscellaneous forests in Tarai area whereas *Bhabar* area had dense growth of Sal dominated forests. Settlements in Tarai Bhabar area were then avoided due to damp and malarial climate and presence of excessive population of wild animals specially

\*Ex field Director Corbett Tiger Reserve, Ex. Chief Wildlife Warden of Uttaranchal & Advisor (Wildlife) Govt of Uttaranchal, 300, Model colony, Araghar, Dehradun.



tigers and elephants.

Post independence period brought large populations of Sikhs from Pakistan some of whom were allowed to be settled in Tarai area of Uttar Pradesh. Extensive deforestation took place and large chunks of wildlife habitat specially that of tigers and elephants were converted into agricultural land. The post independence development efforts brought roads, electricity, education and other facilities in these areas.

It was at this point of time when inhabitants of villages like Dhara, Jhirna and Kothirao (Garhwal) and Laldhang (Nainital) in the south of Corbett National Park and Taria and Kanda (Garhwal) in the north of Corbett National Park started feeling inconvenience due to the presence of dense forests all around them. Their development could not keep pace with villages in Tarai, which had come up much later. The formation of National Park and conservation of flora and fauna only added more difficulty for them as their agricultural crops were raided and incidents of man-animal conflicts increased substantially.

The first request for relocation to an area close to Kalagarh Dam colony was made by some villagers of Dhara, Jhirna and Kothirao in 1973. The Village Panchayat of these villages passed a resolution in favour of relocation on 18.9.1976. The Govt. of U.P. constituted a committee of local MLA, DFO, Tarai West Forest Division and Field Director of Corbett Tiger Reserve in July 1977. Conservator of Forests, Western Circle was later co-opted in the committee. Relocation of village Taria on northern boundary of Corbett National Park was also proposed but the villagers did not agree for the relocation

and it was dropped on their request. Later in 1978 villagers of Laldhang village of Nainital district close to Kothirao village, also requested for inclusion in the relocation scheme, which was agreed.

In a high level meeting held on 29.4.79 and headed by Addl. Chief Conservator of Forests (Kumaon) and attended by concerning MLAs of Garhwal and Nainital districts, Field Director, Corbett Tiger Reserve, DFO, Tarai West Forest Division and Pradhans of the concerned villages, it was decided that the relocation package will include exchange of private land with equal land at new site and no extra land would be given for community purposes and also no land would be given in exchange of encroached land. Initially Guljarpur Forest Block was proposed but later Ampokhara block of Tarai West Forest Division was proposed, which was approved by Govt. of India in 1982.

It was later felt at UP State Govt. level in 1982 that dense forests of Ampokhara block would be sacrificed, so some other site with less vegetation should be selected. This decision was taken in a meeting held on 30<sup>th</sup> June 1982 under the Forest Secretary, U.P. Finally Ampokhara (part), Manpur-Firozpur and Pratap Pur blocks of Tarai West Forest Division were proposed.

All the 4 villages wanted to settle in Ampokhara Forest Block due to its nearness to main road and proximity to Ramnagar town. This led to delay in approval of the proposal by Govt. of India.

I took over as Field Director of Corbett Tiger Reserve in Nov. 1989. I was approached by one gentleman Mr. Jashwant singh of village Jhirna, who had been working hard to get an approval from Govt. of India



and was running from pillar to post between Delhi, Lucknow and Ramnagar. His main problem was to make the villagers to agree to a formula for distribution of land to the 4 villages in the 3 different forest blocks. This led to an impasse, which continued for 8 long years.

### **The Relocation Process**

A meeting of all 4 villages was arranged at Ramnagar on 4<sup>th</sup> July, 1990, which was attended by a large number of villagers from all these villages. There were serious differences among villagers regarding allotment of land at new sites and all of them wanted allotment only in Ampokhara Block. With great debate and persuasion of about 7 hours they could arrive at a formula agreeable to all of them. They finally signed the agreed arrangement. In this meeting it was also unanimously agreed that the proposal for Garhwal and Nainital districts should be submitted separately. Two proposals were thus submitted to Govt. of India through State Govt. One for Dhara, Jhirna and Kothirao villages of Garhwal district and another for Laldhang village of Nainital district.

Mr. Jashwant Singh of village Jhirna made extra efforts to pursue the matter at Govt. of India level as a result of which proposal for relocating Dhara, Jhirna and Kothirao villages of Garhwal district was approved by Govt. of India in May & July 1992. Govt. of U.P. issued sanction in Nov. 1992. After the sanction, villagers of these three villages were apprehensive about just and equitable distribution of land at new site among different individuals. They had reservation from Revenue officials. They also had differences about allocation of land in different Forest Blocks to different villages or group of families

from these villages. I was asked to intervene at every stage. Series of meetings with villagers almost one meeting every month had to be called to sort-out the differences. A large number of people were absentee landlords but once they came to know that the matter of allotment of land close to a highway and near Ramnagar/Kashipur towns was about to mature they also became active and started exerting their influence to get land at best place. This added fuel to the fire. I had always been advising them to sort-out matters among themselves and not allow intervention of Govt. departments. Though help of Revenue Surveyors was sought but the actual distribution of Forest Blocks and individual holding in a particular Block was done by villagers themselves. This process made a fair and just distribution of land among the villagers and they finally moved on to the new site in May 1994, which coincided with my transfer from Corbett Tiger Reserve (in June 1994). The proposal of Laldhang village of Nainital district had some technical difficulty due to presence of some so called landless people and the matter remained pending at the Govt. of India level for another almost 6 years.

### **Relocation Package**

As mentioned earlier, the villagers had initially agreed for exchange of equal land and at that time no other facilities were demanded nor the State Govt. had made any commitment. Meanwhile, relocation of villages had taken place in Kanha Tiger Reserve in M.P. and some other places where Govt. of India had offered some package for relocation of tribal villages from Tiger Reserves. Govt. of India was initially reluctant to give any financial help for these non-tribal villages but on strong pleading by the Field Director it was finally agreed to offer



the same package to them, which was offered for tribal villages.

Each family was granted Rs. 10,000/- for construction of a hut, Rs. 1,000/- for transportation of household goods and Rs. 2,000/- per hectare for leveling of land at new site. Funds were also provided for drinking

water (Rs. 50,000/- per village), approach road (3 Km. @ Rs. 25,000/- per km.) and cattle pond (Rs. 30,000/- per village). At local level the Field Director, Project Tiger arranged land leveling with the help of departmental D-4 tractors, which helped the allottees to take possession quickly.

### The Quantum of Relocation

| Name of Village | No. of families | Human Population | Cattle Population | Land involved (hectare) |
|-----------------|-----------------|------------------|-------------------|-------------------------|
| 1. Dhara        | 85              | 930              | 1100              | 90.205                  |
| 2. Jhirna       | 137             | 1250             | 1400              | 97.028                  |
| 3. Kothirao     | 78              | 800              | 1000              | 29.487                  |
| Total-          | 300             | 2980             | 3500              | 216.720                 |
|                 |                 |                  |                   | (+5.055 Patta land)     |

#### Land Allotted at New Place

| <u>Name of Forest Block</u>  | <u>Area (in ha.)</u> |
|------------------------------|----------------------|
| Ampokhara Forest Block       | 98.344               |
| Partap Pur Forest Block      | 16.590               |
| Manpur-Firozpur Forest Block | 106.700              |
|                              | <u>221.634</u>       |

Relocation of village Laldhang in Nainital District which was originally proposed with above villages got delayed at Govt. of India level and final clearance was received sometime in early 2000. Laldhang village had following demographic figures:

| No. of Families | Human Population | Cattle Population | Land involved (ha.) |
|-----------------|------------------|-------------------|---------------------|
| 111             | 1100             | 1300              | 184.846             |

Due to an ongoing World Bank aided project the relocation could not be possible immediately and this lingered on for sometime. Finally, majority of the families did move to the new site in 2001 but about 18 families with land holdings and about 12 families of so called landless people have not moved out so far and the very purpose of relocation has been defeated both for the people and for the Tiger

Reserve. These families are now trying to encroach upon the land left behind by the oustees. These people who are reluctant to move out try to make living by illegal cutting of Bhabar grass and bamboo and removing huge quantities of fuel wood from the Tiger Reserve for making *Khoya* from the cattle milk. Their intention is also to encroach on the leftover land of people who have already



moved out and there is all likelihood of these people inviting outsiders in the name of eco tourism.

### **Social and Economic condition of outstees at New location**

The social and economic status of the oustees has improved tremendously. They are now close to the developed township of Ramnagar and Kashipur and the fertility of land is several times better. Irrigation facilities have been developed and pucca houses have been constructed by majority of them. They no more keep unproductive cattle. They are on a State highway. Their products have ready market. Many have electricity and telephone facility. Schooling of children has become easy and most of the people are now sending their children to schools and colleges. They have started keeping improved variety of cattle and practice modern agriculture. There is very little or no conflict with wild animals. A revolution has come in their economic and social condition within a very short span of time. Many of the absentee landlords of the original site have become active farmers.

Though the status of their land is no more that of a Reserve Forest but Hon'ble Supreme Court of India has put certain conditions, such as, prohibition of transfer of land for the next 50 years except by way of succession and prohibition in change of land use pattern. This may be in the general interest of the people to prevent agricultural land being diverted for colonisation, industries and hotel and resort business. These activities are likely to convert many people particularly those with smaller holdings into landless category and eventually make them destitute and slum dwellers.

### **The Restored Habitat**

About 273 ha. of land was restored back as prime tiger habitat in 3 separate patches. They are being managed as *Chauras* (grassland) for the prey species. These sites are now prime wildlife habitat with large herds of cheetal grazing on them. One can hear alarm calls of Cheetal, Sambar and Peacock from Jhirna Forest Rest House. Each site has been taken over by the territorial male tigers under their control. Elephants roam around without causing conflicts with humans. Scores of peapheasants keep searching for their food on these patches. The bird life, butterflies, dragon flies and scores of night dwellers now use this area without disturbance.

### **The Lessons Learnt**

- (i) Relocation of villages has generally been regarded as social problem but in this case even the initial initiation was made by the villagers themselves and their elected representatives were always actively associated with the demand of villagers. The involvement of villagers and their elected representatives made the successful relocation possible.
- (ii) The cause of relocation was beneficial both to the people and to the wildlife. In fact relocation was being advocated for the benefit of both of them right from the time of handing over of the forest to Forest Department. The idea of disturbance free habitat for wild animals was mooted as far back as 1861-62, when habitation from Dhikala and Boxar chauras were shifted. This helped in creating the first National Park in the Indian sub-continent about 67 years back and maintain it in prime condition till now. The sacrifice of few people at that time has gone a long way in the conservation history of our country.
- (iii) The villagers need constant guidance



and right kind of intervention from Govt. agency in order to make successful relocation possible. Sorting out of internal differences among themselves and deciding about land allotment process among themselves also helps fair allotment and satisfaction among villagers.

(iv) Relocation process has to be flawless or the situation like that of Laldhang village

will emerge whereby in spite of majority of villagers having been moved, the site still remains occupied by human beings.

(v) The oustees need lot of support and moral back up to establish at the new site. Follow up with district administration for their developmental needs is essential.



## Wild Life Preservation in the Doon & Saharanpur Forest Divisions.

\* M.L. Holdsworth

I think that it was in the autumn of 1955 that a meeting of all those interested in Wild Life Preservation was held at the instance of Mr. Stracey IFS of the Forest Research Institute & Colleges.

At this meeting a committee was formed, of which I was asked to be the ad hoc Chairman, to chalk out a constitution for a Wild Life Preservation Society of Dehra Dun and Saharanpur. Thanks to the energy and experience of Mr. Stracey this was done within a month or so more or less on the lines of similar societies actually and successfully functioning in Darjeeling and the Nilgiris. It involved the taking over by the Society of the allocation of shooting blocks and permit a task at present done by the Forest Department. This scheme was not accepted by the U.P. Government whose reply was that they were undertaking their own measures for the preservation of wild life and particularly for the suppression of poaching. Though the formation of a Wild Life Preservation Society had originally been suggested by Government, it appeared that the only society that would receive their blessing was a collection of Individuals pledged not to use illegal methods or killing games, not to break the game laws and the forest rules, and meeting from time to time to utter pious platitudes about the tragedy of our vanishing wild life. It appeared that Government did not realise the fundamental truth, which the 'ad-

hoc committee' had in mind in drawing up its plan that the keenest and most effective group of people for the purpose of reserving wild life in India were not the arm-chair sentimentalist but the legitimate sportsmen, who had already pledged themselves to observe the game laws.

My I labour this point a little further. Before the abolition of Zamindari and the integration of Native States there were many Zamindars, not to mention the ruling princes, who did a great service to Indian wild life by preserving game on their land. Those people have now lost their rights, and a vacuum has been created, which the State Forest departments are expected to fill. Into this vacuum has flowed, on open lands, the men who is dicimating our dwindling herds of black-buck and chinkara and has already virtually exterminated that fine bird the Great Indian Bustard, by indiscriminate shooting from jeeps. In the forests crop protection guns are not used to protect crops outside the forests but in the forests themselves to shoot deer for the market, or in the care of well-to-do people who are physically incapable of or temperamentally disinclined for stalking by 'still hunting' for the sheer love of killing. Those people have little inclination for shooting tigers and panthers, unless they can safely take a shot from a car at night, in which case, if they wound the animal, they invariably leave it without any

---

\* Mr. M.L. Holdsworth, ex Headmaster Doon School was Chairman, Ad-hoc commettee for Wildlife Preservation, Dehradun (formed in 1955). The article presents a few random reflections of Mr Holsworth by way of review at a time when Wildlife Preservation Organisatin was just being formed by Govt of U.P. as a pioneer step towards protection of wildlife in the state



attempt to follow up. The result is that in this district the tigers either become confirmed cattle-killers, their natural prey of deer and pig having disappeared, or disappear themselves, probably across the Ganges to less disturbed forests. The panthers, so far as my observations go, are not only becoming cattle as well as goat killers, but have taken to hunting in groups of three or four and attacking whole herds of cattle or flocks of goats. In this way panthers are doing more damage to the agriculturists on the fringes of the forest than a hundred cheetal or pig.

The Govt. 's response to this situation is to appoint gamewardens equipped with jeeps and armed forest-guards to track down poachers, particularly at night. I understand that their efforts have been rewarded with some success. But the task that they have to achieve and the area they have to cover is enormous. Our Dehra Dun Warden is responsible not only for Dehra Dun and Saharanpur forest divisions, but, I understand Landsdowne and Bijnor as well. His movements cannot be concealed, and doubtless are watched carefully by the professional poachers. Moreover there is another danger. The Forest Rangers and Forest Guards may feel that, now that a Game Warden has been appointed, they are relieved of the irksome and sometimes dangerous duty of following up poachers. The other day, before going out jungle-fowl shooting, we heard two distinct rifle shots from the other side of the Mohand Rao, inside the Rajaji Sanctuary and fairly audible from the Ranger quarters. There was a Forest College camp at Mohand, but we ascertained that they had no fire arm with them at all. The shots must have been fired at Cheetal, which were out of season then, whether by a permit holder and

whether inside or outside the sanctuary, I don't know.

This brings out to another point, the question of permits, especially small game permits, and their abuse.

I have always received the utmost courtesy from the Forest Department for the eighteen years that I have been shooting in the Doon, and I fully realise that D.F.Os. are very hard worked men. Big game shooting blocks are allotted according to a draw, and, though I have rarely been successful in my applications, I don't wish to complain about the system, except that it is liable to abuse. Some people, who do no shooting, draw blocks and transfer them to their friends for a consideration, or sometimes just out of friendship. I have very little leisure, as a schoolmaster for shooting, but I do like to go out on Sundays and holidays, when I am free, for jungle fowl shooting. With this aim in view I apply for a seasonal small game shooting pass in Dehra Dun or Saharanpur. Annual big-game shooting licenses, and annual and monthly small game licenses are not drawn for. They are allotted at the discretion of the D.F.O. The tradition used to be that the D.F.O. allotted them to people he knew would obey the game-laws. This year, largely through my own carelessness, I was not allotted an annual small game licence for Saharanpur. I then applied for monthly permits. I got them for October and November. When I applied for December & January, I was told that the December permits had all been allotted. They would see about January. In December I was compelled to rely on the charity of other permit-holders. A few days later, I heard that the 'Bearer' of an eminent citizen of Dehra Dun, whose employer had first been complaining of his



incurable drunkenness had got a December permit not only for Dehra Dun but for Saharanpur ! It seemed to me rather odd that the person who had been asked to be chairman of the 'Ad-hoc Committee' for a Wild Life Preservation Society should be unable to get even a monthly permit to shoot small game, while this apparently disreputable person had got one for both forest divisions !

Last year and this year, I have been shooting jungle fowl in the Saharanpur Division generally on Sundays only from the end of October to December. I know the jungle fowl shooting area intimately. I am in touch with Ganeshpur Shikaries who inform me whether any other sportsmen have visited such and such areas. They must know. The curious thing is that in the last two years I have never met any other parties with or without permits in the places where I was shooting. The question arises 'what do the annual or monthly small game shooting license-holders do with their passes'? I am not quite right. I have met one such party, and they had just shot a cheetal - out of season of course. It seems very odd that, apparently every year, the permitted quota for small-game shooting licenses is allotted, but that only once in two years have I come across a party and they were not shooting small game. I know some of the permit holders, of course, and I have, on occasions, heard from my shikaris that they were going to this and that place and I have gone elsewhere. I cannot help feeling however, that many of these annual or monthly small game license holders do not shoot small game, or, if they do, shoot them by methods which, if not actually illegal, are outside the pale of sportsmanship. I mean shooting them on the ground from a car, or sitting in hiding in the early morning near the

edge of a forest and shooting them on the ground when they come out to feed. Many of them, I feel, are not after small game at all but are shooting cheetal and pig and the pass is a valuable scrap of paper intended to secure the opening of forest gates, or to show to a forest guard whom they may meet.

For this reason I think that D.F.Os. should not refuse passes to those who they know will obey the rules, and should not give them to people they are uncertain about, without careful enquiry. I am not making an plea for class privilege or anything of that kind. I know some aristocrats who are confirmed and unrepentant poachers, and many a humble person who is in the best sense of the word a good sportsman.

The pass-holders should constitute our Wild Life Preservation Society. They should all be people who are resolved to stick to the rules and who will use their influence to induce others to do so. Some of them be made 'honorary wardens' and empowered at least to ask armed 'sportsmen' they may meet to show their passes. This would be a useful help to the official game-warden who, as I stated earlier, cannot be in every place at once. But one word of caution. It is no good making honorary wardens of people, however admirable their character, who don't go out shooting. I know one honorary game-warden in a different part of India who never goes out shooting at all. He may express praiseworthy sentiments in drawing-rooms or garden parties but he does not help practically in the job of preserving game.

One final point. I think that the forest staff, rangers and forest-guards should be familiar not only with the local forest rules, but with the game laws of India. Recently in the



second half of the month, I was shooting with two other small game permit holders in a part of the forest that had been old zamindari. The rules state that a small game permit holder may shoot in the last half of the month only in those parts of government Reserved Forest that are not allocated or have not been allocated as big game shooting blocks. We had been shooting for a short time when the Forest Guard came up to us and told us that the Ranger had telephoned him that we must be stopped because it was the second half of the month. We explained to him the position but he returned some time later with & further telephonic communication from the Ranger to the effect that the forest had been reserved as a block by a 'gentleman from Saharanpur'. Now this was quite Impossible, because a) we were not shooting in Government Reserved Forest but in zamindari. b) If we had strayed into reserved forest we should have been shooting in Barkala East which is in the Rajaji Sanctuary, and which cannot be allotted as a shooting block to anyone. We stated as much in a statement in writing, which we all signed, addressed to the D.F.O. through the Forest Ranger. I doubt whether it even got to the former. This incident took place near Kasumri in, I think November this year (1957). My only explanation was that the 'gentleman from Saharanpur' was proposing to have a party in that neighbourhood and had asked the Ranger to turn other sportsmen out. But if the Ranger had known the rules he would never have attempted to interpret.

I wonder, too, whether Forest Guards and Rangers know the regulations about size of heads allotted, close seasons for various animals and birds, and so on. Some curious mistakes are made by the clerks who make out our big game permits. This October I was offered a swamp deer in Timli West ! I have before been offered a Sambhar in its close season and a cheetal as well

I wonder how many sportsmen as well as Rangers and Forest Guards know that female cheetal are always out of season, unless by special permission of the D.F.O., and that a male, even if he is in season, may only be shot if his horn is of or about 33". As I very much doubt whether a head of this size is left in the Doon. It follows that cheetal should have virtually complete protection all the year round. Do they ?

Now, if I may speak for the genuine sportsmen of Dehra Dun, not only too anxious to help in the task of preserving our wild life (before Government turned down our scheme) and still are now that the task has been allotted to the Forest Department. But I think it is up to the Forest Department to ask for our help. Sentimental sympathy from people who seldom go into the forest will do nothing to preserve our wild life. Practical help from keen sportsmen will. I have a sort of feeling that government lumps all shikaries into the same category as 'destroyers of wild life'. May I repeat that if our wild life is going to be saved from extinction it will be done only by the concerted efforts of keen sportsmen.



## Some Indian Bird Types Met With in the Deccan

\*RDA

Last September my garden was visited by a bird that I had noticed the previous September in the compound outside the garden fence. This year it has been bolder, frequenting the garden itself and even venturing under the porch if Henry Ford has not been standing there. It seems now to have gone for good. The Deccan was visited during the ten days before Christmas by a remarkably cold east wind that stripped our deciduous trees, and I think it was too much for my bird and that he may have gone on further south. Anyhow I have not seen him since about that time. He was a slim little blackish bird with red on his under side and on the back above the tail. He carried his tail down, and after making little flashing darts from and back to the place where he was perched, he would send a curious wriggling shiver through all his hindward parts. It was evidently a shiver of pure delight either at the food he had just caught, or at the next morsel he anticipated, or at his own light-hearted self. I am a duffer at birds-it is difficult to be really good at them unless you are willing to use a gun on them at least occasionally-but fortunately our station boasted last year a real bird lover, who could justly apply to himself a quotation from the Psalms that he was fond of, I know all the fowls upon the mountains; and as he knew those of our valleys and plains as well, he was quickly able to tell me that my little shivering friend was the Redstart. No doubt most people know him well, he seems to be

common enough, but to me he was new.

### TWO OTHER BIRDS

I should like to join to this mention of the Redstart an account of two other birds that I have long known and wondered about. They are very common, and one at least is not very easily identified. I think that many people must have noticed them and may be glad to know their names. Neither of them are birds of the garden so far as I know; both belong to those arid, grassy downs (*malran* in the local lingo) that in the Deccan divide the rich black cotton-soil hollows from each other. As you sweep over such rising ground in your car you may often notice a brown bird with a reddish tinge about it rise from the road in front of you and fly ahead with a strong low flight to alight again some forty or fifty yards ahead. It is about the size, and has something of the large bellied shape of a thrush, and supposing it to be one I had for many years failed to identify it. It had never occurred to me that it was a lark, though I suppose if I had taken into consideration its liking for open, downy land I might have gussed better where to start looking for it in the books. I know the bird now for the Rufous-tailed Finch-Lark, and I ought to have known six years ago when Dewar's "Indian Birds" first came my way. For Dewar's book, described in its sub-title as a key to the common birds of the plains of India, can be extraordinarily helpful to one who has no natural gift for spotting birds. He catalogues them in a

\* The article appeared in *The Times of India* editorial on January 24, 1929 by RDA (Full name not known). This has been reprinted here for the benefit of our readers who could appreciate that bird watching was a hobby in India even as far back as 1929.



key according to their colours and any other striking peculiarities, and though he has no illustrations, and does not aim at giving more than a minimum of information about each bird described, his book is the very thing a beginner wants for finding the names of the birds one most often sees.

#### A LARK?

In the same situations as this finch-lark, though not on the hard high road, is another bird that anyone would, I think, without difficulty guess to be a lark and have no difficulty in identifying. There are usually a lot of them together and they are very small. Their colour is brown above and they are hard to see when on the ground, so that the first you know of their presence will probably be a sudden fluttering of little birds from off the ground ahead of you, and they will settle and become invisible again a few yards further on. Watching more carefully for them next time and seeing them, or some of them, before they rise, you will see that they are practically black on the under side and that there is a good deal of black about the head. They are Ashy-crowned Finch-Larks, and it seems that in situations such as I have described they are found all over India. Whether it was either of these finch-larks that, when I lived in a bungalow perched in solitude on an arid down, used to sing to me all night, I do not know, and no one has ever been able to tell me, nor have I ever met anyone else who has heard its nightly song. That is not to be wondered at, for few people can either have lived or camped in quite such a treeless spot. For me it made night beautiful, for it sang whenever I could not sleep, and whenever I woke before dawn; and after all to know its name, though it would be interesting, would add no beauty to the song.

#### THE RED AVADAVAT

Two other birds recently I met with inspire me to write about them. One is the little Red Avadavat, well known I believe in captivity. In the district where I now live we have a number of deep bedded rivers, dammed at intervals by the villagers in the cold weather so that the water may be drawn for sugar cane. In the hedges by these rivers flocks of tiny claret coloured birds are to be found. They are marked here and there with tinges of black, and all over they are very remarkably peppered with little round white spots. How you pronounce this little bird's extraordinary name I should not like to say. Some I believe emphasise the third syllable, others the second and fourth. I think I have somewhere read or been told that it is a corruption of Ahmedabad, and due to a misunderstanding (and a mis-hearing too I should think) by some one who was being told where the birds, caged no doubt, came from, and thought he was being told their name.

#### STONECHAT

There is an excellent and unmistakable (though uncoloured) picture of the Avadavat in a most delightful bird book that has come my lucky way this Christmas. This is a book, which like Dewar, all beginners should know. It is Whistler's Popular Handbook of Indian Birds. I suppose it has already been reviewed in this paper but I hope I may be allowed to give it a further gentle puff. for to duffers like me, and only for them do I dare to write, it is a royal gift. How good its illustrations are, whether the coloured or the plain is shown I think by this that having noticed to-day a slim bird with a black head, white collars and a touch of pink at the top of its otherwise palish under parts, I picked up this new and lovely book to see if I



could trace my bird, and there, on the very first plate I turned to, sat my bird on a twig, with just the markings I had noticed, though rather plumper, I thought, than in real life. Stonechat was his name, and the stonechat it was that I had seen. Open fields are his haunts, and he will flit before you from bush to bush with a little two syllable cry. As he settles on his perch, the topmost twig of a low shrub, just as the book says, he gives himself a slight shake down, reminding me in that of the Redstart with whom I began so that I am not sur-

prised to find that both birds are only a few pages apart in the book. But why oh why, do these good people who know never tell us the why and the wherefore of such points as these ? Why are there nineteen little birds all grouped together as Turdidae ? Why, though they are thus grouped together, are almost none of their generic names the same ? Why have even the three Redstarts different surnames ? What are the points that unite them, and what are the points that separate ? Why cannot bird books tell me these things.



# हिम तेन्दुआ

## Uncia uncia

नरेन्द्र सिंह

हिम तेन्दुआ या हिम बाघ एक ऐसा बाघ है, जिसके दर्शन करना ईश्वर के समान पवित्र और अद्भुत है। यह एक ऐसा बाघ है, जिसमें बिल्ली परिवार के अन्य सदस्यों की तुलना में अत्यधिक अनुकूलन क्षमता है जिसके कारण यह अभी तक जीवित है तथा विपरीत परिस्थितियों में भी अपना अस्तित्व बचाये हुए है। हिमालय की कर्कश जलवायु में भी अस्तित्व बनाये रखने की कला में निपुण यह स्तनधारी प्राणी-40° सेन्टीग्रेट तापक्रम में भी, जहां मांस प्रजातियों की सम्भावनाएं नगण्य हों, अपनी उपस्थिति बनाये रखने में सफल रहा है।

इसे हिम-तुन्दुआ, बर्फानी चीता, भूटिया में बडैल हाये और कश्मीरी में शीन-ए-सूह के नाम से जाना जाता है। यह महान हिमालय श्रृंखला की जैव भौगोलिक क्षेत्र में, मध्य एशिया के दुर्गम पर्वतीय भू-भाग में पाया जाता है। हिम तेन्दुआ विश्व के बारह देशों यथा अफगानिस्तान, पाकिस्तान, भारत, भूटान, नेपाल, चीन, रूस, मंगोलिया, तजाकिस्तान, किर्गीस्तान, कजाकस्तान तथा उज्जबेकिस्तान में पाया जाता है। साइबेरिया के अल्डसी, उल्टाऊ तथा तनी-शान पर्वतों में, तिब्बत, सियाचीन तथा पामीर व हिन्दुकुश पर्वतों में भी इसकी उपस्थिति पायी गई है।

भारत में हिम तेन्दुआ जम्मू-कश्मीर से अरुणाचल प्रदेश के एल्पाइन क्षेत्र में पाया जाता है। जसंकार और लद्दाख क्षेत्र कश्मीर के, लाहौल-स्पीती घाटी हिमाचल प्रदेश की, सिक्किम तथा उत्तरांचल के उच्च हिमालयी क्षेत्रों में हिम तेन्दुआ पाया जाता है। दुर्गम पर्वतीय क्षेत्र, जहां हिमपात होता हो अथवा पूरे वर्ष बर्फ बनी रहती हो, इसका

पाया जाना चमत्कारी है। हिम रेखा के आस-पास अभिगमन करने के कारण इसे हिम तेन्दुआ (Snow leopard) का अभीष्ट नाम दिया गया है। जिन क्षेत्रों में यह पाया जाता है, वहां की संस्कृति एवं कला में इसका विशिष्ट स्थान है क्योंकि वहां के स्थानीय गीतों और साहित्य में इसका भरपूर उल्लेख मिलता है।

उत्तरांचल राज्य में हिम तेन्दुआ उच्च हिमालयी पारितन्त्र का प्रतिनिधित्व करता है। उत्तरांचल के चौदह संरक्षित क्षेत्रों में से सात में इसकी उपस्थिति पायी गई है, जो उत्साहवर्द्धक है। यह उत्तरकाशी, चमोली, बागेश्वर एवं पिथौरागढ़ जनपदों में पाया जाता है। नन्दादेवी राष्ट्रीय उद्यान, फूलों की घाटी राष्ट्रीय उद्यान, गोविन्द राष्ट्रीय उद्यान, गंगोत्री राष्ट्रीय उद्यान, केदारनाथ वन्य जीव विहार, गोविन्द वन्य जीव विहार तथा अस्कोट वन्य जीव विहार इसके प्रमुख आश्रय स्थल हैं। हिम तेन्दुआ, बड़ी बिल्लियों में सुन्दर एवं दुर्लभतम वन्य प्राणी है। जॉर्ज शैलर ने 1973 में पाकिस्तान की हिन्दुकुश पहाड़ियों में इस अद्भुत जीव का प्रथम छायाचित्र लिया था। इससे अनुमान लगाया जा सकता है कि यह कितना शर्मीला एवं मिथकीय प्राणी है। हिमालय में भरल इसका मुख्य भोज्य प्राणी है। जहां भरल होंगे, वहां पर हिम तेन्दुए के पाये जाने की प्रबल सम्भावना रहती है।

सामान्य गुलदार अथवा तेन्दुए से अपेक्षाकृत छोटे आकार का यह स्तनपायी एक मांसाहारी प्राणी है, जिसकी उपस्थिति लगभग 3500 मीटर से 5500 मीटर ऊंचाई तक पायी जाती है। इसकी लम्बाई 100-110 सेमी० होती है तथा व्यस्क होने



पर इसका भार 40-50 किलोग्राम से अधिक नहीं होता है। पीले-भूरे रंग की खाल पर काले-काले धब्बे होते हैं तथा शरीर पर मृदुल परन्तु सघन बाल होते हैं। पैरों पर जो धब्बे होते हैं वे ठोस होते हैं, शेष खुले-खुले धब्बे जिन्हें रोजेट कहते हैं। शरीर का निचला भाग सफेद रंग का होता है जिसमें कहीं-कहीं हल्के रंग के धब्बे होते हैं। पूंछ अपेक्षाकृत लम्बी, मोटी तथा सिर पर ऊपर की ओर गोलाई लिये हुए ऊपर-नीचे झूमती रहती है। पूंछ की लम्बाई, शरीर के लगभग एक तिहाई के बराबर होती है। यह गद्देदार होती है, जो शीतकाल में तापमान को बनाये रखने में सहायक होती है। हिम तेन्दुआ के गले का ध्वनि-तंत्र विकसित नहीं होता है और इसी कारण से यह बहुत गहरी दहाड़ नहीं मार सकता, मात्र मिमिया और खखार सकता है। हिम तेन्दुआ सम्प्रेषण के प्रत्यक्ष एवं अप्रत्यक्ष साधनों का उपयोग करते हैं। यह तेन्दुआ गुराता है, धमकाता है, हिसिंग करता है, मिमियाता है और अन्य बिल्लियों की तरह हौकंता भी है परन्तु यह जोर से दहाड़ नहीं मार सकता।

इसके पंजे इसके शरीर की अपेक्षा भारी होते हैं जो अपने से बड़े प्राणी का आखेट करने में सहायक होते हैं। इसकी नासिका छिद्र-स्थल बड़ा होने के कारण श्वास की वायु को गर्म करने में तथा शीतकाल में जहां तापक्रम ऋणात्मक हो, जीने एवं सुरक्षित रहने में सहायता प्रदान करता है।

हिम तेन्दुआ की गुप्त गतिविधियों एवं स्वभाव के बारे में, निशाचर होने तथा अत्यन्त दुर्गम भू-भाग तथा विपरीत जलवायु में रहने के कारण इसकी पारिस्थितिकी के संबंध में अपर्याप्त जानकारी उपलब्ध है। हिम तेन्दुआ के विभिन्न पहलुओं पर शोध आदि अधिक न होने के कारण इसके बारे

में अभी तक अल्प ज्ञान ही है।

हिम तेन्दुआ के प्राकृतावास में बहुत कम वनस्पति पायी जाती है क्योंकि इसका अधिकांश भाग वर्ष भर हिमाच्छादित रहता है तथा कहीं-कहीं चट्टानें एवं नुकीली चोटियां होती हैं। अधिकांश क्षेत्र ठण्डे रेगिस्तान जैसे होते हैं जहां वर्षा नगण्य होती है। इसके प्राकृतावास वृक्ष विहीन, हिमाद्रि बुग्याल एवं हिमाच्छादित ग्लेशियर होते हैं। इन बुग्यालों के साथ लगे झाड़ीनुमा वन, मुरिण्डा तथा बुरांश के वन पाये जाते हैं, जहां पर यह शीतकाल में विचरण करता है।

हिम तेन्दुआ एक एकाकी आखेटक है। हिम तेन्दुआ अपने से तीन गुने बड़े प्राणी का सुगमता से आखेट कर सकता है। इसके मजबूत पंजे, त्वरित छलांग एवं चपलता, हिमालय के उच्च स्थलीय प्राणियों को मार सकने में इसे सक्षम बनाते हैं। इसके प्रमुख भोज्य प्राणी भरल, मार्को पालो भेड़, आइबैक्स, मरखोड़, कस्तूरी मृग, ऊनी खरगोश एवं लम्बी पूंछ वाले चूहे होते हैं। यह चकोर तथा स्नो कॉक जैसे पक्षियों को भी शिकार बना लेता है। स्थानीय लोगों से पता चलता है कि यह याक व गाय की संकर प्रजाति 'जो', खच्चर, गधे, भेड़ तथा कुत्ते को भी खा जाता है। किसी मनुष्य और याक पर हमले के कोई उदाहरण नहीं मिले हैं।

डांग ने अपने शोध अध्ययन (1967) में यह अभिलिखित किया है कि 34 प्राणी इसका आहार बने हैं। अधिकांशतः यह शिकार गर्दन पर अपने मुंह से काटकर एवं रीढ़ की हड्डी तोड़कर करता है। भरल इसका मुख्य भोजन माना गया है। शीतकाल में हिम तेन्दुआ के द्वारा भेड़ों की खुड़ियों में घुसकर शिकार करने के दृष्टान्त भी सामने आये हैं। उन्होंने यह भी बताया है कि हिम तेन्दुआ प्रातः काल की प्रभात बेला में शिकार



करता है तथा अधिकांश नर प्राणी इसका शिकार होते हैं। जार्ज शैलर (1973) के अनुसार यह कभी-कभी पशुओं के बाड़े और खुड्डियों पर आक्रमण करके 10-15 भेड़ों को मारते देखा गया है।

यह भोर में तथा गोधूलि के समय अधिक क्रियाशील रहता है। भोजन की खोज में इसे बहुत दूर चलना पड़ता है क्योंकि इसके प्राकृतावास में प्राणियों की संख्या बहुत अधिक नहीं है। वयस्क याक, ताकीन और कियांग का आखेट करने में सक्षम नहीं है क्योंकि वे बड़े प्राणी हैं। हाँ उनके बच्चों का आखेट कर सकता है। यद्यपि इसकी 'होम रेंज' के बारे में बहुत अधिक ज्ञान नहीं है। परन्तु इस बात से अनुमान लगाया जा सकता है कि पशुओं और वन्य जीवों की खोज में किसी क्षेत्र-विशेष में कितने अन्तराल के पश्चात आता है। रघुवीर सिंह चन्दावत (1990) ने जम्मू कश्मीर के हेमिस राष्ट्रीय उद्यान में इसकी होम रेंज 19 वर्ग किमी० आंकी है। प्राणियों के शिकार करते समय यह पर्वतीय धरातल की ऊबड़-खाबड़ एवं टूटी-फूटी शिलाओं को अपने छिपने के स्थान के रूप में उपयोग करता है, जहां से तीव्र दौड़कर यह प्रश्नगत प्राणी को दबोचने में सफल हो जाता है। ऐसा पाया गया है कि नर भरल आदि अधिकांश इसके शिकार बनते हैं, अपेक्षाकृत मादाओं के सहवास काल में नर व मादा हिम तेन्दुए मिलकर योजनाबद्ध तरीके से शिकार करते पाये गये हैं तथा शिकार करने के पश्चात साथ-साथ मांसाहार करते हैं।

यह स्तनपायी प्राणी शनैः शनैः भोजन करता है और इसी आदत के कारण अधिकांशतः इसके शिकार किये गये प्राणी से दूर भगा दिया जाता है। कुछ क्षेत्रों में, जहां पर घरेलू पशु रहते हैं, हिम तेन्दुआ कुछ सीमा तक उन पर आधारित

रहता है। यह अपने शिकार किये हुए प्राणी पर निगाह रखता है और उसकी हिमालयन ग्रिफन, लैमरगियर, जंगल क्रो तथा मैगपाई जैसे गिद्धों एवं पक्षियों से सुरक्षा करता है। हिम तेन्दुआ अपने शिकार को छाती से या ऊपरी पैरों के मध्य से खाना प्रारम्भ करता है। कभी-कभी यह अण्डाशय या जांघों से खाना प्रारम्भ करना भी पसन्द करता है तथा पाचन तंत्र को बिना खाये छोड़ देता है। जम्मू-कश्मीर के हेमिस राष्ट्रीय उद्यान में हिम तेन्दुए के वार्षिक भोज्य प्राणियों की संख्या इस प्रकार आंकी गई है।— भरल-05, तिब्बती ऊनी खरगोश-09, मारमोट्स-25, पालतू बकरी-05, घरेलू भेड़-01 तथा विभिन्न पक्षी-15। जब तापमान बहुत अधिक कम हो और कड़कड़ाती ठण्ड-40° सेन्टीग्रेड तक पहुंच जाती हो तो हिम तेन्दुआ *Myricaria squamosa* को डण्डलों पर जीवन यापन करने को मजबूर होना पड़ता है।

ऐसे कोई प्रमाण नहीं मिले हैं कि हिम तेन्दुआ मानव बस्ती के पास रहते हुए भी कभी इसने आदमी पर हमला किया हो या उसे मारकर खाया हो। बल्कि ऐसा पाया गया है कि यह आश्चर्यजनक रूप से मानव की उपस्थिति को सहन कर लेता है।

हिम तेन्दुआ सामान्यतः एकाकी जीवन व्यतीत करता है। केवल माँ तेन्दुआ अपने शावकों के साथ रहती है और जब नर और मादा हिम तेन्दुए पारस्परिक सहवास करते हैं। कई बार सहवास काल में युगल तेन्दुए लुक-छिपकर आखेट करते हैं और साथ-साथ रात्रि-भोज का आनन्द लेते हैं। यद्यपि ये अकेले ही यात्रा करते हैं और वह भी लम्बी-लम्बी यात्राएं (10-20 किमी० तक) और कभी-कभी तो वयस्क नर के साथ मादा हिम तेन्दुआ तथा बड़े बच्चे भी देखे गये हैं, जो



अभी माँ से बिछुड़े न हों। युगल छिपकर, प्रतीक्षा करके तथा घात लगाकर सामूहिक आखेट करते हैं।

नर व मादा हिम तेन्दुए, दोनों अपने क्षेत्रों का सीमांकन गन्ध तथा मल छोड़कर और चिन्हांकन करके करते हैं। जब मन उल्लसित हो और सहवास की प्रबल उत्कंठा हो तो नर व मादा गन्ध छोड़कर एक-दूसरे को आकर्षित करते हैं तथा यह उल्लसित काल 2 से 8 दिन का होता है तथा सम्भोग प्रक्रिया 3 से 4 दिन तक क्रमशः चलती रहती है। हिमालयी क्षेत्र में मार्च-अप्रैल में इनका सहवास होता है तथा जून-जुलाई में सन्तानोत्पत्ति। 500 ग्राम से 650 ग्राम तक के बच्चे जिनकी आंखें बन्द होती हैं, पैदा होते हैं। एक प्रसव में 2 से 3 बच्चे पैदा होते हैं जो कभी-कभी 4 तक भी पैदा हो जाते हैं। बच्चे एक सप्ताह बाद अपनी आंखें खोलना प्रारम्भ करते हैं। 5-7 सप्ताह आयु के बच्चे अपनी माँ से निकलकर बाहरी जीवन से परिचय करते हैं।

हिम तेन्दुआ एशिया की संकटग्रस्त बिल्ली प्रजातियों में सर्वाधिक दुर्लभ प्रजाति है। यह प्रजाति 1968 तक कश्मीर में पीड़कजन्तु (Varmin) के रूप में देखी जाती रही है। भारत में वन्य जीव (संरक्षण) अधिनियम 1972 में इसे अनुसूची-1 में रखा गया है, जिससे इसके उच्च स्तरीय संरक्षण प्राप्त हुआ है। यह और भी प्रसन्नता का विषय है कि भारत, पाकिस्तान और नेपाल ने इसके आखेट पर पूर्ण प्रतिबन्ध लगाकर इस सुन्दर वन्य प्राणी को विशेष संरक्षण प्रदान किया है। इण्टरनेशनल यूनियन फॉर कन्जर्वेशन ऑफ नेचर एण्ड नेचुरल रिसोर्सस (IUCN) की रेड डाटा बुक में इसे 'संकटग्रस्त' श्रेणी में रखा है। कन्वेंशन ऑन इण्टरनेशनल ट्रेड ऑफ एन्डैण्डर्ड स्पेसीज (CITES) ने हिम तेन्दुआ को अनुसूची-1 में

स्थान देकर इसे संकटापन्न प्रजातियों में सम्मिलित किया है।

उत्तरांचल के चार जनपदों उत्तरकाशी, चमोली, रुद्रप्रयाग तथा पिथौरागढ़ का लगभग 55% आरक्षित वन संरक्षित क्षेत्रों के अन्तर्गत आता है, जो हिम तेन्दुए का प्राकृतावास है। यदि भौगोलिक क्षेत्रफल की दृष्टि से देखें तो इन चार जनपदों का 21% से अधिक भू-भाग संरक्षित क्षेत्रों के अन्तर्गत आता है। इससे स्पष्ट है कि वैधानिक दृष्टि से इस प्रजाति को बहुत अच्छा संरक्षण प्राप्त है, परन्तु कठिन भू तल, स्टाफ की कमी, गश्त के लिये शीतकालीन वस्त्र, उपकरण एवं हथियारों की कमी तथा प्रशिक्षित वन कर्मियों का अभाव, ऐसे कारक हैं जिस पर ध्यान दिया जा रहा है और जुलाई 2006 में उत्तरांचल वन विभाग ने हिम तेन्दुए के संरक्षण की एक कार्य योजना भी तैयार की है।

यद्यपि अप्रत्यक्ष प्रमाण मिले हैं कि उत्तरांचल के अति उच्च स्थलीय क्षेत्रों में हिम तेन्दुए की उपस्थिति है, फिर भी विस्तृत अध्ययन एवं शोध के द्वारा इसकी संख्या तथा व्यवहार के बारे में प्रमाणिक जानकारी प्राप्त हो सकती है। भारतीय वन्य जीव संस्थान द्वारा गोविन्द वन्य जीव विहार एवं राष्ट्रीय उद्यान (1985) तथा नन्दादेवी राष्ट्रीय उद्यान (1993 व 2003) में हिम तेन्दुए से संबंधित कुछ सर्वेक्षण अवश्य किया गया है। उत्तरांचल में गंगोत्री राष्ट्रीय उद्यान के उत्तरी क्षेत्र, नन्दादेवी राष्ट्रीय उद्यान के आन्तरिक क्षेत्र, फूलों की घाटी राष्ट्रीय उद्यान के ऊपरी क्षेत्र, अस्कोट वन्य जीव विहार का पंचकुली जलागम क्षेत्र, रूपकुण्ड, वेदिनी बुग्याल, बद्रीनाथ क्षेत्र, नीति घाटी के ऊपरी क्षेत्र तथा चमोली-पिथौरागढ़ के सम्पर्क क्षेत्र हिम तेन्दुए के प्रमुख वास स्थल हैं। इन क्षेत्रों में शोध कार्य किया जाये तो हिम तेन्दुए के



पारितन्त्र के संबंध में अन्य रोचक तथ्य प्राप्त हो सकते हैं।

हिम तेन्दुए को प्रत्यक्ष देखने के प्रमाण बहुत कम हैं। गोविन्द राष्ट्रीय उद्यान में दो बार 1992 तथा 1996 में पर्यटकों द्वारा इसे देखा गया है। केंदारनाथ वन्य जीव विहार में माइकल ग्रीन द्वारा एक बार हिम तेन्दुए को देखा गया है। मलारी के पास 1994 में भारतीय-तिब्बत सीमा बल के सुरक्षा प्रहरी द्वारा गलत पहचान के कारण तथा आत्म सुरक्षा में एक हिम तेन्दुआ मारा गया था। नन्दादेवी राष्ट्रीय उद्यान में तैनात वन कर्मियों द्वारा कभी कभार इसके देखे जाने की बात कही जाती है परन्तु पद चिन्ह, मल एवं पिछले पैरों से मृदा पर की गई खुरचन से पुष्टि होती है कि इन क्षेत्रों में हिम तेन्दुआ विद्यमान है। चन्दावत (1987-90) ने तीन वर्षों में मात्र 3 बार इसे हेमिस राष्ट्रीय उद्यान में अपने शोध काल में देखा था जिसमें प्रथम बार हिम तेन्दुए को पकड़ कर उसे रेडियोंकालर लगाकर छोड़ा गया था।

समूचे हिमालयी भू-परिदृश्य में हिम तेन्दुए की अनुमानित संख्या लगभग 750 आंकी गयी है जिसमें से 100 चिड़ियाघरों में हैं। स्वच्छन्द विचरण करने वाले हिम तेन्दुए की कुल संख्या, हिमालयी नेपाल में मात्र 150-300 के मध्य ही अनुमानित की गई है। 100 पाकिस्तानी हिमालय में तथा लगभग 250 पाकिस्तान द्वारा अधिकृत कश्मीर में होने की सम्भावना है (जॉर्ज शैलर, 1985)। 400 हिम तेन्दुए भारत के उत्तर-पश्चिम में पाये जाने का अनुमान है। लद्दाख में अत्यधिक आखेट होने के पश्चात भी लगभग 200 हिम तेन्दुए होने की सम्भावना व्यक्त की गई है (दार व गौड, 1984)।

एक मोटे अनुमान (फॉक्स, 1994) के अनुसार विश्व में लगभग 3500-7000 हिम तेन्दुए विद्यमान

हैं। भारत में इसका प्राकृतावास लगभग 75,000 वर्ग किमी० क्षेत्र में फैला है जिसमें इसकी संख्या मात्र 200-600 के मध्य आंकी गई है। उत्तरांचल के 7 संरक्षित क्षेत्रों (5618 वर्ग किमी०) तथा अन्य हिमाच्छादित क्षेत्रों में हिम तेन्दुए के होने के प्रमाण, भरल की चेतावनी ध्वनि के रूप में, पंजों के निशानों के रूप में, टट्टी के रूप में, खरोंच के रूप में और नाखूनों के निशान व पेशाब की गन्ध के रूप में मिलते हैं। यद्यपि एकाध बार स्थानीय नागरिकों द्वारा तथा खोजी दल के सदस्यों को भी क्षणिक दर्शन हुए हैं तथापि इसकी निश्चित संख्या का अनुमान नहीं लगाया जा सका है।

विभिन्न सर्वेक्षणों एवं अनुमानों के अनुसार यह निष्कर्ष निकालना सुगम नहीं है कि उत्तरांचल में हिम तेन्दुओं की संख्या कितनी है ? फिर भी एक सुरक्षात्मक अनुमान 25-30 हिम तेन्दुए की संख्या का हो सकता है तथा उत्तरांचल में इसका मुख्य आहार भरल तथा थार है, साथ ही बुग्यालों में पालतू भेड़, बकरी आदि की ग्रीष्मकालीन उपस्थिति भी इसके जीवन का आधार माना जा सकता है।

विश्व के विभिन्न उच्च स्थलीय प्राणी उद्यानों में हिम तेन्दुए की संख्या लगभग 100 है। पश्चिमी बंगाल के पद्मजा नायडू प्राणी उद्यान, दार्जिलिंग में इसके प्रजनन का कार्यक्रम सफलतापूर्वक सम्पन्न किया जा रहा है। उत्तरांचल के गोविन्द बल्लभ पन्त प्राणी उद्यान, नैनीताल में भी इसी प्रकार के प्रयास प्रारम्भ किये गये हैं, जहां 2004 में दार्जिलिंग से एक हिम तेन्दुआ लाकर युगल बनाया गया है जिससे भविष्य में संरक्षण योजना के उत्साहजनक परिणाम प्राप्त हो सकते हैं। हिमालय के अति संवेदनशील उच्च स्थलीय हिमाच्छादित क्षेत्रों के पारितन्त्र में हिम तेन्दुआ



एक स्वस्थ पर्यावरण की सूचक प्रजाति है और इसके वासस्थल मानव जाति के लिए जल स्तम्भों (Water Towers) का कार्य करते हैं। भारत की अधिकांश नदियों का उद्गम स्थल हिम तेन्दुए के प्राकृतावास का अंग है, वहां विद्यमान हिमनद एवं हिमाच्छादित पारि तन्त्र संरक्षण से ही हिम

तेन्दुए का संरक्षण सम्भव है। अतः यदि यूं कहा जाये कि हिम तेन्दुए एवं उसके भोज्य प्राणियों के संरक्षण में ही जल संरक्षण सम्मिलित हैं तो अतिशयोक्ति नहीं होगी। स्पष्ट है कि हिम तेन्दुए के संरक्षण में भारत की जल सुरक्षा सन्निहित है।

### हिम तेन्दुए की संख्या का अनुमान (मैककार्थी और कैपरॉन, 2003)

| राष्ट्र       | प्राकृतावास क्षेत्रफल | अनुमानित संख्या |
|---------------|-----------------------|-----------------|
| अफगानिस्तान   | 50000                 | ? 100-200       |
| भूटान         | 15000                 | ? 100-200       |
| चीन           | 1100000               | 2000-2500       |
| भारत          | 75000                 | 200-600         |
| मंगोलिया      | 101000                | 500-1000        |
| नेपाल         | 30000                 | 300-500         |
| पाकिस्तान     | 80000                 | 200-420         |
| रूस           | 130000                | 150-200         |
| तजाकिस्तान    | 100000                | 180-220         |
| किर्गीस्तान   | 105000                | 150-500         |
| कजाकस्तान     | 50000                 | 180-200         |
| उज्जबेकिस्तान | 10000                 | 20-50           |



# Seasonal Monsoonal Migration of Ganges River Dolphin in Karnali River and Feeder Streams of Nepal

\*Dr. Tej Kumar Shrestha,

## Abstract

Migration of Ganges river dolphin (*Platanista gangetica*) was studied in the Karnali river and its feeder streams of Nepal. Results demonstrate that dolphin strictly follow prespawning migration of fishes during June and post-spawning migration in November. Result shows that dolphin remain in headwater feeding ground of Karnali tributaries from June to October and return to main river Karnali in November. In future, additional conservation measure will be required to safeguard migratory dolphin population in main river and tributaries. However, studies of free ranging migratory dolphin are rarely undertaken in Nepal because such observation in flooded river of monsoon is extremely difficult and risky.

## Introduction

Although Anderson (1878), Pilleri (1970), Kasya and Haque (1972), Shrestha (1995) made an intensive study on the distribution of Ganges river dolphin distribution and biology of dolphins. Except for the distribution, status and ecology of Ganges river dolphin there is little information on migration and behaviour. Studies on migratory behaviour is made to assist formulation of monitoring management and conservation of migratory dolphin population. At present author takes an opportunity to report migration of Ganges river dolphin in the feeder streams of the Karnali river (Fig. 1). This report is based on observation made on June 2003 to May 2006.

Nepal lies on the southern slope of Himalayas. There are four major river systems of Nepal, which arise from Himalayas and are constantly fed by melting snow, glaciers, torrents and by seasonal rains. Nepal is drained by Karnali (Ghagra) and Mahakali (Sarada) in the western region. Besides these, Gandaki (Narayani) river drain in central Nepal and Koshi in eastern Nepal. All of the river systems join Ganges river system of India. The upper and middle reaches to all the river are torrential, low temperature and current is barrier for the distribution of Ganges river dolphins. The lower reaches of the river is admirably suitable for the survival of dolphin. Erection of major power-dams in lower reaches towards Indo-Nepal border are posing great threat for the seasonal migration of dolphin in Nepal. Nepalese rivers and their tributaries provide hydrographically unique waterscapes, pools and rapids mitigating nursery habitat needs for juvenile and adult dolphins. Presence of Kailashpuri and Girijapuri dams in Indo-Nepal border have checked movement, population growth and intermixing of upriver and downriver population. Dolphins also have been target of hunters and fishermen in spillway and tailwater of the dam during low water phase of the river. Fishermen take advantage of dolphin's seasonal migratory behaviour and are heavily exploited for oil in Indo-Nepal border (Table 1).



**Table 1 Ganges River Dolphin Life Table**

|                   |                                                                                                                                                                                                                                                                                                                      |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scientific Name   | <i>Platanista gangetica</i>                                                                                                                                                                                                                                                                                          |
| Status            | Endangered                                                                                                                                                                                                                                                                                                           |
| Habitat           | Freshwater                                                                                                                                                                                                                                                                                                           |
| Weight            | 82 to 150 kg                                                                                                                                                                                                                                                                                                         |
| Size              | 1.5m - 2.5m                                                                                                                                                                                                                                                                                                          |
| Longevity         | About 28-30 years                                                                                                                                                                                                                                                                                                    |
| Diet              | Fish, shrimp, crab, mollusks and aquatic Invertebrates                                                                                                                                                                                                                                                               |
| Habits            | Seasonal changes in habitat and movements of Gangetic dolphins are not well documented, but there is clear evidence of seasonal distribution and migration of dolphin traveling upstream as water level rises and entering feeder streams and traveling downstream as water level fall or subsides (Shrestha, 1995). |
| Birth Season      | Females produce young at any time of the year with peak in May and June (Shrestha, 1995).                                                                                                                                                                                                                            |
| Gestation period  | Approximately 1 year                                                                                                                                                                                                                                                                                                 |
| Birth rate        | As a rule single young is born some time twin are also born                                                                                                                                                                                                                                                          |
| Early Development | At the age of 6 months of the birth, the young starts accepting solid food.                                                                                                                                                                                                                                          |

### **Mohana River as Principal Feeder Stream and Monsoon Resort of Dolphin**

Mohana river is a headwater feeder stream of the Karnali river supporting high density of migratory population of dolphin. It drains to and fro along border of Kailali district and Indian border before joining the Karnali river at Chaugurdighat. During its course through Kailali it is fed by many small streams such as Turila, Mohana, Godavari, Khutia, Surmi, Kanari, Tengna, Kada, Kanara, Pathariya and Ghuraha. All these feeder streams of Mohana flow southwards from the foothills of the Churia range in Kailali. All these small tributaries of Mohana and the river Mohana itself has very shallow and hold variable amount of flow during the dry periods.

During onset of monsoon, Mohana holds bankful water with higher flow and swift current. River Kanara joins, Mohana at Madiyaghat. Kanda and Pathariaya river join at Baradahawaghat before they flow into Mohana at Mohana-Pathariya confluence, near south of Bardahawaghat. Migratory population of dolphin join fish migration in these rivers. Both young and adult dolphin are seen hunting fishes in all these feeder streams with great excitement at Kusumghat. Mohana drain along the Indo-Nepal boarder eastwards to unite with the Kauralia branch of Karnali river at Chaugurdighat. I counted regularly 12 dolphins in August 2003, near Kusumghat ferry but local people tell that they encounter each day 30-50 dolphins during high flood.



## Methods

A transect was established to study migratory movement of dolphin and population changes in the Karnali river and its feeder streams. It is simple procedures to establish number of transect of straight lines across the river channel perpendicular to flow. These transects were established at two river confluence.

Dolphin surveys were conducted along Karnali River and its tributaries particularly in Mohana river in different seasons. Intensive surveys were carried out by rowboat along the channel of the Karnali and its feeder stream. During each survey, the river was covered twice, once moving upstream and once downstream. Studies were made at various times in the Kaurelia, Mohana and Grewa branches of the Karnali and their confluence site and the main Karnali river. In the Karnali surveys, dolphins were counted from the banks of the river using 7X35 binoculars and a camera with a 200 500 mm telephoto lens equipped with a power winder and 400-1000 ASA film. The surveys were made from both banks of the river simultaneously, with three observers on each bank recording surfacing and diving times with a tape recorder and counting the dolphins. When conditions were suitable, a video camera was used to record surface activity; the video were also examined to confirm counts of surfacing dolphins. At the time when the riverbanks were inaccessible due to flooding, observations were made from an elephant back or elevated cliff. Polaroid sunglasses were used to combat the intense glare on the river at mid-day. Nine survey points were used; all were covered in a single day, during daylight hours. Between 30 and 60 minutes were spent at each survey point. The dolphins were counted only after considerable time had been spent observing size, shape, colour and natural marks of the individual animals, to avoid counting the same individuals. A theodolite was used to measure width of the river,

dimensions of pools, etc. Detailed environmental and hydrological data were collected during the surveys are summarized in a form of Hydrograph (Fig. 2).

During the surveys and collection of reports, people living near the river and local wildlife officials were interviewed and asked for information about sightings of dolphins. They were shown photographs of the Susu to avoid confusion with various large fishes and crocodiles that inhabit the river. The Ganges river dolphins that are killed due to flood event were dissected and their gut content and were also examined for fish food taken by them (Table 4).

Ecological study on migration of Gangetic dolphin (*Platanista gangetica*) was conducted between June 2003 to May 2006 in the Karnali river of Nepal. The dolphins were abundant in the river in past twenty years ago. The Karnali river holds now residual population of dolphin fewer than 12 individuals but in wet season more than 32 individual may be counted during upstream migratory run in June and July. Many part of riverine habitat are further fragmented due to the changing water table and dewatering effects. Some populations of dolphins are however present at lower reaches of Karnali river near Kothiaghat. Industrial pollution, extensive use of agricultural pesticides, harmful fishing practices (gill netting, drift netting) and barrier effects of dam probably caused rapid decline of dolphin. But the habitat destruction is increasingly important near Indo-Nepal border where habitat is poor, human disturbance assumes greater significance. There is no evidence of food competition with twin river species such as Mugger (*Crocodilus palustris*) and Gharial (*Gavialis gangeticus*) crocodiles. The dolphin is now protected species by law but illegal netting and killing takes place at night along Indo-Nepal border. Dolphins are occasionally killed when they get stranded in shallow water



during September. They become easy target of spear and bow and arrow. The steep decline in this internationally important Ganges river dolphin is of great concern. There is an urgent need for research, development plan of Nepal Government for holistic preservation of riverine habitats e.g., invertebrates, fishes and abiotic components etc.

### Observation

The Gangetic dolphin are active both night and day. They typically travel slowly 8 to 25 km in a small, tightly knit group along the river channels, hunting, chasing migratory fish. The dolphins feed in larger groups, apparently in more coordinated fashion, when they are in shallow water tributaries. Their movement may be correlated with spawning movement of cyprinid fish, the mahseer (*Tor tor*, *T. putitora*), which is their principal prey. Fishermen also report that dolphin and mahseer arrive onto confluence site of main river and tributary with advancing flood and use their flexible body and beak for chasing and rounding the catch. Fishing group of dolphins make a tight circle around the school of spawning fish show their back and pointed beak, lash their fluke through the middle of the circle and lunches a fish through the air ahead of dolphins. This behaviour is known as "fish kicking".

### Migration and Spawning of Mahseer and Dolphin

Migration and spawning of mahseer proceeds in group. Especially large individual show up in early monsoon (June-July) and traveled each day about 10km with dolphin. The smaller mature group of male and female who reached first maturity followed by larger groups in July-August. They spawn during the height of flood. Spawners stayed in the spawning creek and confluence site of river, feeder stream and creek till the peak hydroperiod of monsoon flood. As monsoon water is withdrawn in October post-spawned fish return downstream feeding ground of the Karnali river with dolphins.

Most of mahseer showed upstream spawning with maximum length of 20 km to 50 km. They spawned 3-5 times in feeder stream or creek joining the main channel of the Karnali river i.e., mostly near confluence sites. Spawning grounds are characterized by a current velocity 0.5 m/sec, shallow depth (0.1-0.8 m/s) and gravel bottom, where most eggs adhered. It is remarkable that the deep bodied mahseer spawned each time together at the same ground. During the incubation period of spawned eggs, the water level fell-down and some part of spawning ground where dry and dewatered and a lot of embryo dead.

The feeding activity of dolphin could be best seen during winter due to high transparency of the river water. Feeding activity is best recorded during the winter. Although it was difficult to determine all spawning species of fish that dolphin feed upon during the flood, it is note worthy that large number of small cyprinids such as Galphulani (*Ambypharygodon mola*), Marod (*Aspidoparia morar*), mrigal (*Cirrhinus mrigala*), Kalonch (*Labeo calbasu*), stone roller (*Crossocheilus latius*), Glass perch (*Ambassis nama*), mud perch (*Nandus nandus*), barb (*Puntius sarana*, *P. ticto*, *P. sophore*) were abundant in the feeder streams where dolphins were feeding actively (Table 4). Some fishes injured by dolphin teeth and many that have escaped from capture of juvenile dolphins were also collected. In June and July I found that females of most of fish species contained ripe eggs in the running condition evidencing the breeding season of fish. The tooth marks on escaped spawners gave indication that the particular species was most favourite food of dolphin. After the water level subsided during November these species could no longer be found in the feeder streams. The appearance fry in the river bank indicated that spawning has taken place. Fisherman fishing there with down river facing trap also supported our observation, that these spawning fishes migrated downstream of the



Karnali river. At the time of retreat of flood most female fish have had spent ovary.

Although fishermen in the area believe that commercially important small fish make up an important part of dolphin diet, they also claim that dolphins feed on most of other species of cyprinid and silurid fishes as well. While local fishermen claim that minor cyprinids are swallowed by dolphins, they also report that lower halves of larger species of fishes are taken, some large fishes over a meter long are eaten by dolphins. Fishermen often find head portion of big fishes, anterior to dorsal fin floating in the dolphin pools. These poor people eat these upper halves of the fishes, if they are fresh. Generally, upper halves of fishes are also taken by cormorants (*Phalacrocorax carbo*), river terns (*Sterna aurantia*) and fishing eagles hovering near the pool surface. Many fishermen claimed that dolphins eat lower halves of larger fish, because dorsal fins are of hindrance and most of fishes also have dorsal spines. In July 2003 the head portion of *Bagarius bagarius* was found floating. In September 2004, head portion of *Pangasius pangasius* and remains of *Mystus seenghala* also recovered many times by the author.

During the height of the monsoon flood major carps such as golden mahseer (*Tor putitora*), deep bodied mahseer (*Tor tor*), rohu (*Labeo rohita*), catla, (*Catla catla*) and mrigal (*Cirrhina mirgala*) enter in large number in the spawning assembly of the Mohana river for broadcasting their spawn. Three spawning migration ascending Pathariya river, a feeder stream of Mohana river confluence were observed in between July, 15, 2003 to September 15, 2003. As it took place in high flood period of monsoon, fishes were safe to deposit spawn only along shallow water river banks of depth 2-5 m. Many fish eating predators including dolphins, large egret (*Ardea alba*), grey heron (*Ardea cinerea*), mallard (*Anas platyrhynchos*), river tern (*Sterna*

*aurantia*), large cormorant (*Phalacrocorax carbo*), Darter (*Anhinga rufa*), otter (*Lutra lutra*) and turtles (*Aspideretes gangeticus*) were seen enjoying feast of fishes. Fishing activity of these animals was delightful to watch.

During headwater migratory episode water surface temperature of main Karnali river fluctuated from 25 to 31 °C that of Mohana river fluctuated 26 to 32 °C. Current velocity in the Koshi river was 1.5 to 3.5 m/sec, pH of water fluctuated between 6.5 to 9. The dissolved oxygen reached almost to 4.5 ppm. Adult male and female dolphin preyed upon fish 15-25 cm length group such as jalkapoor (*Clupisoma garua*), knife fish (*Notopterus chitala*), catla (*Catla catla*). The young or calf dolphin foraged on small fishes chased.

The Ganges dolphins did not permanently inhabit a particular area or pools of the Karnali river. They constantly moved upstream and downstream of the river for feeding and breeding which result in the changes in their number in a river. They were seen near Grewa and Oroi river confluence where densities of fish are quite high. The marked seasonal changes in dolphin distribution and density over much of the Nepalese rivers are due, at least in large part, to fluctuation in water levels, current velocity and turbidity. For example, during the low water phase of the dry season from October to April, many dolphins leave the feeder streams of the Karnali river systems (Mohana and Patheriya) and congregate in the main so called Kauralia channel of the Karnali river, and they return again to tributaries the following rainy season. However, some individuals, mainly young ones (calf) remained in the tributaries throughout the dry season and wait there for meeting migratory adults next year. The seasonal movement of the Ganges river dolphin were observed in the Mohana river (a feeder stream of the Karnali river) and its



feeder streams. Most observations were made in the Karnali and Mohana river confluence at Chaugurdighat, Mohana and Pathaiya confluence sites. Most of dolphins were migrating from main branch of the Karnali river

to feederstreams for food, shelter, rearing and growing young ones. They returned to main river (Karnali) soon after flood subsided in tributaries. (Table 2 and 3)

#### Record of Episode of Dolphin Migration

*During monsoon period June to September, the major river system such as Karnali swells with flood water and overflows its banks threatening survival of Ganges river dolphin and fishes. During this period dolphin follow fish migration in head water feeder streams. The head water feeder streams of the Karnali river is such as Oroi and Mohana looked upon as resting refugia and nursery ground of dolphin in monsoon.*

*On September 2004, three dolphins moved towards Oroi river from Girwa branch of the Karnali river following strictly spawning migration of mahseer (Tor tor, T. putitora) and other small fishes such as catfishes and major carps. Local people termed this as fish-follow migration. Migrating fishes showed up their back while moving anticurrent towards upper reaches and took gulp of air exposing their nostril at water surface. School of the dolphin also followed closely fish migration. They too showed up their hump or back as well as long probing snout and exposed their blow hole frequently at the interval of 15-25 sec. During September 18, 2003 dolphin stayed almost all time in the high flood period stayed near confluence site of Mohana river and its feederstreams (Kusumghat) preying upon varying species of fish and sizes. Most of time dolphin enjoyed communal fishing at the shallows of feederstream or byriver called Vangaloos. Even after monsoon flood subsided in October current and eddies were quite strong, so the author preferred to carry out other ethological studies in the main river and tributaries rowing boat at shallow water embankments.*

*In the Karnali river, the extent of feeding migration of the dolphin was observed in a magnitude of 10-25 kms in winter and 25-45 kms during the monsoon flood. Dolphins do have their favourite areas or coves during flood period during June to September. During rainy season (June-September), they stayed in the feeder streams, where water is relatively clear and density of spawning fish is high. In the dry season (December-April), they joined in main river cradle where flow is low and fish density is quite high. Dolphins migrated pool and deep gorges during the breeding season (February to May) for mating purpose. At this time they selected deep water pools or gorges with feeble current for mating purpose. Usually feeding migration often took place between May to June just after first pre-monsoon rains begun.*

*The juvenile Gangetic dolphin remained in the dry season pools of main cradle of Karnali river from October to April. This time ichthyomas mass was stable, remained concentrated in deep pool of the Karnali river, they spent much time hunting, chasing the fish. Females gave birth of young by April and May coincide first rains. As soon as pre-monsoon rain started in June water become turbid, breeding ichthyomas got dispersed and dolphin migrated towards feeder streams. Dolphin with their calves also migrate upriver, they engaged themselves in hunting and chasing diverse species of breeding fishes.*

*At one incident Sept 10, 2003, 12 dolphins (8 adult and 4 juveniles) were encountered in between confluence site of Patharia and Mohana river. These two rivers are the feeder streams or tributaries of the Karnali river. Most of the dolphin encountered were young distinguished by their greyish brown skin, they were surfacing frequently than their parents.*

*It was found that migration of dolphin triggered by changes in water volume, turbidity and explosive spawning migration of fishes. As main cradle of river become flooded, turbidity, depth and current velocity increased, dolphin could not withstand such change and moved upriver feeder streams where water clear, oxygenated and water velocity is moderate, depth is ideal.*

*Three year observation showed that in the tributaries of Karnali river such as Oroi and Mohana should good spawning population of fish arrived each year. They swam as thick moat and engaged into mass spawning activity. Here dolphins were seen assembling in a feeding group chasing spawning fishes each time along the shallows sometimes were seen displaying fish catch in air with great excitement.*

*According to local people during the high flood of monsoon 2003, two stranded dolphins were seen Chaugurdighat due to lost their ecolocating power found dead after two days. One of the dolphins also entered irrigation canal of Gauri Nala near Dhangad and dead there. These dolphins dashed or rushed near wall of irrigation canal and was seriously injured. Death due to accidental by-catch in gill net fishing net was occasional. People also enjoyed dolphin shooting with bow and arrow and guns along their back while surfacing. People also tried harmful fishing techniques such as spilling poisoned herb and pesticides in water and scooping out dead fish. Dolphin is also happened to eat poisoned fishes due to insecticides (half dead fish). No intoxicated and poisoned dolphin eating poisoned fish were observed.*



Table 2

**Summary of Dolphin Survey in the Floodplain of Karnali river and Feederstream during Flood Period of June 1 to October 1, 2004**

| River Section Surveyed                                                      | River Ecology                                                                                                                                                                                                                                                                                                                                                                                                                                      | Habitat Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | Dolphin Sighted |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| Mohana river at Kusumghat (Mohana and Pathariya River confluence site)      | The shoreline is very wide and unstable. The bed load consists of, silts and sand. The river swollen with turbid water about 300 m wide and 10-20m deep. Here 7 dolphins are regularly seen at this spot. Professional fishermen from Nepal and India ply their fishing boat and set their drift net and gill nets for fishing. Dolphin by catch in fishing net at night.                                                                          | River bank is not easily approachable by boat. Strong current and ripples preclude navigation.. The pH of water varies from 6 to 9 and current velocity 3 to 5 m/sec. Water surface temperature 25 to 30 °C. Fish swarming takes places in the clear water confluence site of the so-called Pathariya Khola and Mohana river. Dolphins were seen chasing spawning fishes rounding their fish catch along shallow bank. of the clear water of the Pathariya streams.                                                                                                                                                                                        | 4               |
| Karnali river at the confluence with Mohana river near Chaugundighat        | Grewa channel of the Karnali river is meandering creates many channels and oxbows making summer resort for dolphin. River 200 to 300 m wide channels are seen there.                                                                                                                                                                                                                                                                               | River bank is very much eroded and not shaded with trees. Many uprooted trees are seen in the river bank. The bank is unstable, exposed, bottom is covered with pebbles and fine sands. Drifting wood, leaves and twig cover the bank. Wood cutters, shepherds and cow herders collect tree trunk and woody matter for firewood. Fishermen take best advantage of the situation. They catch juvenile dolphin as by catch in their gill net. Adult dolphins are seen hunting and fishing motif occasionally entering oxbows and backwater of pools created by boulders. Many drift net fishermen capture ripe fish with running eggs in the feeder streams. | 3               |
| Girwa branch of Karnali river near Kothiaghat near Karnali Oroj confluence. | Floodplain of the Grewa branch of the Karnai river has sandy bottom. The river is about 150 to 300 m wide in flooded condition. Here Karnali river carves out numerous criss-crossing channels                                                                                                                                                                                                                                                     | The river water is laden with high silt load. The river bank is unstable habitat is much disturbed. Water is so turbid that it appears half solid, half liquid. Drifting material consists of logs, wood, rhizomes, rooted vegetation. About 8 dolphins are occasionally seen. many gill net and drift net fisherman seen catching spawners by means of baited hooklines.                                                                                                                                                                                                                                                                                  | 3               |
| Kauriyala branch of the Karnali river at Rajapur                            | Karnali river is highly disturbed by human activity. The width and depth varies 300-500 m and 10-20 m. River is broken into number of sister channel. many fisherman seen plying their boat near the bank, drift wood collectors are seen collecting uprooted trees, tree trunks, branches for fire-wood. Occasionally wildlife such as deers, blue bull, sambar, boars are seen washed away by flood. Situation in the river bank is cataclysmic. | River bank is sandy and muddy. River water contains a lot of organic matter rotten, leaves, debris that suffocate fish and impair respiration. Fish kills were observed along river banks. Occasionally very young dolphins are seen stranded and lying helpless. The river is not navigable by boat due to strong eddies current, with high crest and ripples. Rescue operation is dangerous and not fruitful at all.                                                                                                                                                                                                                                     | 2               |
| <b>Total dolphins sighted</b>                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | <b>12</b>       |



**Table 3**  
**Dolphin Sighted at Indian Frontier of the Karnali River**

|                                                                                       |                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |           |
|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Karnali at Indian frontier between Katarniaghat Wildlife Sanctuary Girijapuri Barrage | The Karnali river is highly disturbed by human activity. The river with spans of 400 to 650 m wide and 20-50m deep. Number of fishing boat plying near the bank, stone mining and rock mining is common. | Girijapuri barrage is low barrage without fish ladder. During monsoon flood period water level above and below the barrage shows no appreciable difference. Dolphins were seen crossing barrage with great difficulty. Only at low water phase of winter barrage pose threat to migratory population. Burst of dolphin activity seen at early morning and at night. Highly turbid silt laden water affect dolphin swimming ability. They come near shallow bank near barrage. Dolphin caught as by catch in fisherman gill net. Dolphins are often seen stranded near barrage due to failure of echolocating power later is killed by fishermen at night. | 20        |
| <b>Total dolphins sighted</b>                                                         |                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | <b>20</b> |

**Table 4**  
**Showing Food Preferences of Ganges Dolphin, during Explosive Fish Migration period of July**

| Common Name  | Vernacular Name | Scientific Name              | Food Preference Order |
|--------------|-----------------|------------------------------|-----------------------|
| Minor carp   | Sidra           | <i>Puntius ticto</i>         | ++++                  |
| Minor carp   | Sidra           | <i>P. sarana</i>             | ++++                  |
| Minor carp   | Sidra           | <i>P. sophore</i>            | ++++                  |
| Mahseer      | Sahar           | <i>Tor tor</i>               | ++++                  |
| Mahseer      | Pahelo Sahar    | <i>Tor putitora</i>          | ++++                  |
| Minnow       | Marod           | <i>Aspidoparia morar</i>     | ++++                  |
| Stone roller | Mate Buduna     | <i>Crossocheilus latius</i>  | ++++                  |
| Mud perch    | Dalahi          | <i>Nandus nandus</i>         | ++++                  |
| Murrel       | Charangi        | <i>Channa punctatus</i>      | ++++                  |
| Murrel       | Charangi        | <i>C. gachua</i>             | ++++                  |
| Garfish      | Kauwa           | <i>Xenentodon cancila</i>    | ++++                  |
| Perch        | Chaner bijuwa   | <i>Ambassis nama</i>         | ++++                  |
| Spiny eel    | Bam             | <i>Macrogathus aculeata</i>  | ++++                  |
| Goby         | Lata            | <i>Glossogobius giuris</i>   | +++                   |
| Carp-minnow  | Galara          | <i>Barilius bendelsis</i>    | +++                   |
| Carp-minnow  | Namshera        | <i>Chela labuca</i>          | +++                   |
| Carp-minnow  | Namshera        | <i>Salmostoma phulo</i>      | ++                    |
| Carp-minnow  | Piruwā          | <i>Amblyphrynogodon mola</i> | ++                    |
| Carp-minnow  | Dedhawa         | <i>Esomus danricus</i>       | ++                    |
| Medium carp  | Gorahi          | <i>Chagunius chagunio</i>    | +++                   |
| Stone roller | Buduna          | <i>Garra gotyla</i>          | ++++                  |
| Carp         | Mrigal          | <i>Cirrihinus mirgala</i>    | +++                   |
| Carp         | Kalonch         | <i>Labeo calbasu</i>         | ++++                  |
| Carp         | Rohu            | <i>L. dero</i>               | +++                   |
| Carp         | Rohu            | <i>L. gonius</i>             | ++                    |
| Shrimp       | Jhingae         | <i>Penaeus sp</i>            | +++                   |
| Craab        | Gangata         | <i>Cancer sp.</i>            | +++                   |
| Mollusc      | Ghonghi         | <i>Pila sp.</i>              | ++                    |

- ++ least preferred, +++ less preferred, ++++ well preferred, +++++ highly preferred



## Discussion and Conclusion

Although Anderson (1978), Pilleri (1976), Kasuya and Haque (1972), Shrestha (1992) made extensive study on distribution of dolphin in rivers, little is said about migration of dolphin population to head water feeder stream. Present study reveal for the first time upriver yearly migratory cycle of dolphin with coinciding high water monsoon flood.

Several environmental factors are correlated with the onset of headwater or upriver migration of Ganges river dolphins (Shrestha, 2002). Water quality, water level, discharge, gustatory impulses temperature have been identified as the most important factors related to migration.

Anderson (1878), Pilleri (1976), Kasuya and Haque (1972), Shrestha (1995, 2004) made extensive study on distribution of dolphin in rivers, little is said about interstream migration of dolphin population. Present study reveal for the first time synchronization of upriver migratory cycle of dolphin with flood cycle of river and mobile breeding fish population in the main river and tributaries. Further, snowfed and rainfed water coupled with murky run off impart peculiar river odour that provide gustatory impulse to fish and dolphin for upriver migration.

Development of dam and irrigational canal provide new threat to migratory dolphins (Shrestha, 1995, 2001). They deflect normal course of migratory movement. Operation of novel types fine meshed nylon drift nets, electrofishing and dynamiting activities are equally fatal for dolphins survival. Fishing gears such as rolling hooks, cast net, drift nets pose threat to young dolphin having weak sonar capabilities.

The present investigation demonstrates positive relation correlation between rise of water volume unstable discharge of flood water and the number of upstreaming dolphin.

Likewise fall of water volume and stable discharge shows downstream migrating tendency. Ganges river dolphin exhibit significant habitat shift through their lives during hydrological period of flood and draught. The breeding areas are mostly found in deep pools of main river Karnali. After the young is born in May and June river water quality changes due to seasonal rain so also temperature and current velocity. Dolphins begin upriver migration towards headwater tributary in June for search of better fish food and nursery for growing youngs. Although feeding condition improve considerably in the new environment of head water upriver tributaries and river confluence, but the change of the habitat condition is critical during their life cycle (Fig. 3).

- a) spectacular Gangetic dolphin migration to head waters feeder stream of the Karnlai river were recorded with the coinciding event of fish migration for first time.
- b) Dolphin migration coincided prespawning migration of fish between June and August, dolphins migrated from Karnali river to tributaries (Mohana river) following spawning migration fishes. Dolphins spent about four months (June-September) at the confluence of feeder streams or tributaries hunting and chasing spawning fishes.
- c) During the wet hydroperiod of monsoon (August-September) adult dolphins and young dolphins remained in feeding ground of small tributaries rearing their new born calves and training them fish hunting.
- d) Knowledge of migration and dispersal of dolphin in tributaries will contribute greatly to development of more biologically realistic dolphin



conservation strategy related to fishery strategy and action oriented

f) High turbidity due to seasonal monsoon provide stimulus for upriver migration of dolphin.

### Management Consideration

Life cycle of Ganges river dolphin revolves round clear water feeder stream and turbid water principal river. The confluence site of the headwater feeder streams feeding main river Karnali serve as refugia for migratory dolphin population in the monsoon flood period. Beyond this general understanding however, detailed information on utilization of such headwater feeder streams by dolphin and spawning migration of fish is limited. This paper describes monsoonal movement of the Ganges

river dolphin towards headwater tributaries of the Karnali river. The present paper also highlights need of regulation for opening and closing of existing flood gates (sluice gate) of barrages in Nepal-India border to facilitate migratory dolphin and fish population to headwater and fulfill their feeding and reproductive urge. For this purpose spillway and other tailwater of barrages should be protected for migratory population and fishing should be prohibited there and around. The author shows clearly that population of the dolphin exhibit distinct specific behaviour patterns that persist at seasonal scale and are related to the changes in water level, velocity and migration of fish school during monsoon.

### Acknowledgment

I am thankful to Dr. Govind Prashad Sharma, Vice-chancellor of Tribhuvan University for his interest in dolphin research. I am thankful to research division of Tribhuvan University for help and support.

### References

- Anderson, J. 1878. Anatomical and zoological researches: comprising an Account of the Zoological Results of two expeditions to western Yunnan in 1868 and 1875 and a monograph of the two cetacean genera *Platanista* and *Orcella*. 2 Vols. B. Quaritch, London.
- Kasuaya, T. and Aminul Haque, A.K.M. 1972. Some information on distribution and seasonal movement of the Ganges dolphin and seasonal movement of the Ganges dolphin. Sci. Rep. Whales Res. Inst. 24: 109-115, pls. 1-3.
- Pilleri, G. 1970. Observations on the behaviour of *Platanista gangetica* in the Indus and Brahmaputra rivers. Investigations on Cetacea 2, 27-60.
- Shrestha, T.K. 1983. Determining status of dolphin and crocodile in the Karnali river of Nepal. National Council of Science and Technology (Unpublished Report).
- Shrestha, T.K. 1986. Ecology of Gangetic Dolphin *Platanista gangetica* in Karnali river of Nepal. In: Nepal Himalaya Geo-ecological Perspective, Dr. S.C. Joshi *et. al.* (ed.). pp 111-142.
- Shrestha, T.K. 1995. The Ganges River Dolphin. A Study of the Wilderness and Biodiversity of the Himalayan waters of Nepal. B. Shrestha, Kathmandu. p. 242+169 plates
- Shrestha, T.K.I. 2001. Endangered Dolphins. Shangrila, January-March Issue. Royal Nepal Airlines.



Shrestha, T.K. 2002. Conserving Gangetic dolphin in Nepal. King Mahendra Trust for Nature Conservation. Vol. 5:2, pp 2-3.

Shrestha, T.K. 2004. Migration of Ganges river dolphin in the Koshi river and its tributaries. Cheetal 42(1-2): 9-18



## Avifauna in Some Water Systems of Purulia District, West Bengal, India

\*R. Chakraborty and S. Kar

### INTRODUCTION

A close dependence of man on water for life accounts has existed over centuries. In the process of dependency of using surface water for development, man has interfered so much that water flow of streams and rivers is checked even by constructing barrier. Thus, ecological systems have been drastically changed in the down stream and water quality is greatly affected by the presence of dissolved and suspended matters. It is realized that though these river valley projects *viz.* construction of dams *etc.* inputs enhancing productivity in agriculture, fishery, hydel power *etc.*, yet, in the long run it causes adverse environmental and social impacts (Goldsmith & Hildyard, 1984).

The total water system of Purulia district includes dams, *bunds* (a type of water reservoir) and river systems. During the recent past large area of forest land has been transferred into agricultural field or inundated due to construction of several dams on rivers and rivulets to meet up irrigation problems as the chief livelihood of the district is agriculture. The accumulation of water in the tanks or *bunds* depends on rainfall or water runoff only. A number of small dams on the small streams and rivulets are being constructed and number of water reservoirs *viz.* Sahebbund, Ranibund *etc.* were built before the independence. The river systems of the district mainly consist of the tributaries of rivers Damodar, Kangsabati

and Silabati, which are originated from the Chhotanagpur plateau and retains water only in the monsoon and postmonsoon periods. Of these some river systems have been selected for studying the avifauna of the district.

The birds are believed to be the indicator of the good health of an ecological niche. Thus, for several reasons both diversity and population of avifauna are believed to be much affected due to anthropogenic activity. Scattered works on avifauna have been carried out (Mazumder *et. al.* 1992) in the district but no such consolidated work on avifauna of the water systems with the records of migratory birds have been carried out so far. A number of birds migrate to our country from the far north of Eurasia in the winter (Ali & Ripley 1978, Ripley 1982) every year. But district wise population density and species diversity of the same have not yet been worked out. So, an attempt has been made to prepare a consolidated report on avifauna of water systems with special emphasis on migratory ducks in Purulia district.

### TOPOGRAPHY

The district Purulia is the western most district of West Bengal. It is girdled by the Tropic of Cancer. The latitude and longitudinal extents are from 22°42'23" N to 23°42' North and from 85°49'25" E and 86°54'37" E respectively. The physiographic location of the district may be characterized in between the alluvial plains of West Bengal and the ancient



plateau of Jharkhand. Purulia district has hardly any natural boundary. Only about hundred kilometers of the district boundary follows the Damodar river in the north and the Subarnarekha river in the west. Purulia has its boundaries on the east with the Medinipur and Bankura districts of West Bengal; on the north with the Bardhaman district of West Bengal and Dhanbad district of Bihar; on the northwest, west and southwest with the districts Hazaribagh, Ranchi and Singhbhum of Jharkhand. A part of the north boundary runs through the centre of the 'Panchet Reservoir' while eastern boundary runs partly through the centre of the Kangsabati reservoir.

The district has a gently undulating topography with occasional hillocks of hard rocks. The highlands of Purulia are actually the remnants of the spurs projecting from the Ranchi plateau to the west and functioning as watersheds of the Subarnarekha – Kansai – Damodar group of rivers. The Ajodhya hill forms the main highland region of Purulia and the west and south of Ajodhya hill, occur a number of residual hills, isolated and detached from the parent body. Though the Dwarakeswar, the Kangsabati, the Silabati and large number of rivulets originate in the district itself, yet they offer very little irrigation facilities. Thus, the district is characterized by the presence of largely distributed wasteland.

### STUDY AREA

Study was conducted along the river systems, dams and tanks or bundhs of the Purulia district. Certain small and large dams were selected for the study viz. Panchet, Totco, Turga, Rupai, Murguma, Kangsabati and Loharia dam. Six small river systems were selected for the study viz. Chaka, Jamuna, Dwarakeswar, Satgurung, Kumari and

Brahminy. Along with the above areas another two sites were selected i.e. Sahebbund and Ranibund, which are man made large water reservoir, and retain water throughout the year. Details of the study areas are given below.

**Panchet Dam :** The dam on Panchet hill is the largest dam of the D.V.C. project, built on the river Damodar. It is a four-mile long dam of earth and concrete running north to south with a vast reservoir of approximately 10,966 sq.km. which receives 115 to 163 cm rainfall annually of 10,966 sq. km and a hydel power station of 40,000 KW. capacity. The construction of the dam was started in November, 1952 and completed by July, 1959. Part of the dam is situated in the Rhaghunathpur subdivision.

**Totco Dam :** It is a small dam, situated approximately 9 km north to Bandwan town at SE Purulia in the Bandwan subdivision. It was built on Totco river in the year 1993 and the reservoir is approximately 20 ha.

**Turga Dam :** Turga dam is situated on the down hill of Ajodhya at SW Purulia under the Bagmundi subdivision. The main water source of the dam is from Turga falls as well as water runoff during monsoon. The reservoir measures approximately 1200 x 500 sq. mts and some submerged highlands look like small islands which are full of bushes as well as aquatic vegetation and also provide a secured resting and breeding place for aquatic birds. The surrounding forest area of the dam is an ideal roosting place for birds.

**Loharia Dam :** The Loharia dam is situated in the forest area of Bagmundi Range in the Bagmundi subdivision. It is built on Kistobazar nallah which is a tributary of Shova nallah. Kistobazar nallah originates from the Ajodhya hill at an elevation of 610 m and meets the



Shova nallah in plains and finally joins to Subarnarekha river.

**Rupai Dam :** Rupai dam is situated on the river Rupai near Kuki village of the Jhalda subdivision. It is made up of earth and concrete and construction was completed in the year 1972.

**Murguma Dam :** Murguma dam is constructed on the river Saharajore on Lasadi hill of Jhalda subdivision. It has got an well wooded island in the dam which has got a very narrow connection with the main land.

**Kangsabati Dam :** Kangsabati dam is constructed on the river Kangsabati and situated in between the lat. 22°57'23" N and long. 86°45'23" E. The catchment area of the dam site is 3626 sq. km. The rivers Silabati, Bhairabanki and Tarafeni also release water in the dam through the river Kangsabati. The major portion of the dam is situated in the Bankura district of West Bengal. Only a portion of the dam is with Manbazar subdivision of Purulia.

**Sahebbund :** Sahebbund is a large water reservoir, situated in the heart of Purulia town of the Purulia subdivision. It is surrounded by concrete constructions and metallic road.

**Ranibundh :** It is also a large jheel situated just at the side of the SH2 in the Jaipur subdivision and retains almost its wilderness inspite of human activity in the jheel.

**River system :** All the rivers are originated from the high lands of the Purulia and Jharkhand district and running through the townships, forested areas as well as agricultural fields. Study on avifauna of Chaka river was carried out chiefly in the Jhalda subdivision and the same of Dwarakeswar in Kashipur subdivision, Brahminy in Bagmundi subdivision as well as Jamuna and Satguring in Bandwan

subdivision and Kumari in Balarampur and Barabazar subdivision.

## METHODOLOGY

Study was carried out during 2001-2003 particularly in the monsoon and postmonsoon months. Sight record was determined with the help of high power binocular. For population study selected areas were divided into separate grids on linear transect with the plot measuring approximately 250 x 250 m<sup>2</sup>, at least ten in number and each quadrate area was treated as 'per sight' area and the mean expressed as 'population per sight'. Sampling plots were selected on the transect randomly. However, survey was also carried out outside the sample plots on foot as well as by country boat or car.

Taxonomic status was followed after Ripley (1982), Ali & Ripley (1983) and Majumder *et. al.* (1992).

## OBSERVATION

Observed species diversity and population per sight are tabulated in Table I.

## RESULTS AND DISCUSSION

In the district Purulia of the State West Bengal, a total of 72 bird species belonging to 17 families were observed in the aquatic ecosystem. The species diversity varies from 10% in Loharia dam, the lowest and the highest upto 61% in Totco. The same was below 20% but above 10% also in Turga and Murguma and within 20% to 40% in most of the aquatic systems viz. Kangsabati (38%), Rupai (22%), Sahebbund (28%), Ranibundh (26%) and river systems (20%). The percentage of species diversity in Panchet dam was also high (57%).

Birds observed in the aquatic system of Purulia district is tabulated (Table I) along with its residential status, seasonal preference



and population per sight. Mother with hatchling of Little Grebe, Little Cormorant, Pond Heron, Water cock, Moorhen, Purple Moorhen, White breasted Waterhen, Coot, Bronze winged Jacana, Pheasant tailed Jacana, Cattle Egret, Little Egret and Openbill Stork were observed in good number during monsoon or in early postmonsoon but in the next oncoming season major population inflation was not observed. So, it could be presumed that the first generation birds may shift from their breeding place to any other favourable area. Among the study area the most favourable breeding ground of aquatic birds was Ranibundh.

During the two years study Large Whistling Teal were seen only in the Sahebbund, situated in the heart of the Purulia town in the postmonsoon of 2003. Only a dozen or little more number of Large whistling Teal was seen in association with Lesser whistling Teal (Chakraborty and Kar 2004a, 2004b). As Large Whistling Teal is included in the Schedule I, Part III of Wildlife (P) Act, 1972 (Ammended in 2004). Thus, proper protection of its habitat is needed. Sahebbund area is getting polluted day by day due to rapid developmental work along the site.

Although 12 migratory species of ducks observed in different aquatic systems of Purulia district, but no species were observed in Turga, Loharia and Murguma dam. It may be due to lack of agricultural or swampy fields adjacent to those dams which are the most favourable feeding ground of migratory ducks. Other reasons may be the anthropogenic disturbance of postmonsoon months like picnic, blowing of microphones, washing of vehicles, clothes, utensils etc. As the dam areas are not very large, so the winter

visitors as well as other aquatic birds may bound to avoid those areas in postmonsoon season.

During the study period only a pair of Grey Lag Goose was seen in Rupai dam in January 2003 but none was observed in any other water system. It may be the diversion of route for a single pair from the main flock. But it was reported by the local people that Grey Lag Goose was not uncommon in the district even during the late 19<sup>th</sup> century.

A small flock of about 52 numbers of Ruddy Shelduck was observed only in Rupai dam in the month of January 2003 but in the previous year no Ruddy Shelduck was observed in any water system of the district. A very small flock of 16 numbers of Wigeon was observed only in Sahebbund in the month of January 2003 and 6 numbers of Shoveller was observed in the inundated grass beds of the Totco dam along with domestic ducks at dusk in January 2002 but in the successive year no shoveller was observed either in the same locality or in the district. Among the observed migratory ducks during postmonsoon of 2002-2003, Tufted ducks were seen maximum in numbers. In respect of population, Red Crested Pochard and Pintails are next to Tufted duck. The White-eyed Pochard and Common Pochard were seen always along with Red Crested Pochard. It is really astonishing that, one of the most commonest winter migrant, the Common Teal, was very less in number during the successive two years of survey.

In the fifteen study area along with other water bodies of the district the mean population (species wise) of the migratory ducks per year were approximately Pintail  $\pm$  9000, Common Teal  $\pm$  600, Gadwall  $\pm$  6500.



Garganey  $\pm$  6000, Red Crested Pochard  $\pm$  10,000, Common Pochard  $\pm$  2000, White eyed Pochard  $\pm$  3000 and Tufted Duck  $\pm$  15,000 (Chakraborty and Kar 2004b). Other ducks which were observed in a single year in a particular locality are not considered here.

Gauntlet (1985) observed 13 species of migratory ducks in Durgapur barrage while during the present study Mallard and Bar headed Goose of the Gauntlet's list were not seen in the barrages of the Purulia district. In this context it could be mentioned that Ruddy Shelduck, Grey Lag Goose and Wigeon were seen only in 2003 and Shoveller in 2002. So, it is realized that some winter migrants are not regular visitor of the district.

Gauntlet (1985) observed five species of Tern in Durgapur barrage but in the present study areas except Whiskered Tern no other species of the family Laridae was observed (Table I). The birds like Little Cormorant, Pond Heron, Cattle Egret, Little Egret, White breasted Kingfisher were seen in all the seasons near any water body. So, they may be considered as most common birds of the district. The Bitterns were seen in Totco and Panchet dams yet they were not very frequent to see. The population of Openbill Stork was not very high but it was distributed in small flocks throughout the district. Lesser Adjutant was less common than Openbill Stork and more frequent in the paddy fields rather than aquatic body. Resident population of Cotton Teals were also observed in other water bodies other than study area.

The Plovers and Wagtails were more common on the stony pebbles of the river systems. The Waders were also seen in limited number not only in the study area but also throughout the district. On the other hand

migratory Baillon's Crake and Water Rail were only seen in Panchet and Totco respectively (Table I).

Except Brahminy kite other member of the family Accipitridae was observed in the forested area with streams and pools like Duarsini and Simni-Jabbar. Remarks against each individual species (Table I) is an attempt to clarify its present population status. Among 72 species, recorded by the present authors, 32 were migratory, and the rest were almost resident of which 26 species also moves locally.

There is so much decrease in wildlife due to poaching as well as habitat destruction throughout the country. Though the species diversity is not much lower in the district Purulia yet breeding habitat as well as population of water birds are not satisfactory. One of the reason may be tribal dominance in the district. The district is comparatively less developed in the State, and at present several developmental work like construction of hydel power project, tourism projects *etc.* has been started. Though inundation of land for construction of dam ultimately effects both terrestrial and micro fauna of that area but on the other hand it accelerates the growth of viable population of many water birds, as well as attracts the aquatic winter visitors. Gradual increase in awareness definitely be helpful in future for conservation of wetland and its residents and special attention must be given to the winter visitors. At the same time some activities like tourism, including eco-tourism, water sports and other anthropogenic activities should be logistically controlled by the respective authorities, otherwise breeding ground of water birds as well as visiting ground of winter migrants may be drastically affected.



## ACKNOWLEDGEMENTS

Authors are thankful to the Director, Zoological Survey of India for providing all the facilities to carryout this study. Authors are also indebted to the officers and staff of the Department of Forest, Govt. of West Bengal for providing all sorts of help in the field.

## REFERENCE

- Ali, S. & S.D. Ripley, 1983 . Handbook of the birds of India and Pakistan. (Compact edition). Oxford University Press. New Delhi.
- Chakraborty Rina & S. Kar, 2004a. Assessment of habitat as well as avian and mammalian diversity in the Purulia district, West Bengal. *Rec. zool. Surv. India* . 103 (3-4) : 87-124.
- Chakraborty Rina & S. Kar, 2004b. Migratory ducks in some water systems of Purulia district. *West Bengal*, XLVI(5) : 16-17.
- Gauntlet, F.M. 1985 . Durgapur barrage as a water bird habitat. *J. Bombay nat. Hist. Soc.* 68(3) : 619-632.
- Goldsmith, E. & N. Hildyard, 1984 . Social and Environmental effects of large dams. Vol. I. Ecosystem Ltd., Camelford, U.K.
- Mazumdar, N., C.S. Roy, D.K. Ghosal, J.M. DasGupta, S. BasuRoy & B.K. Datta, 1992 . Aves : State Fauna Series 3 : Fauna of West Bengal, Part-I : 171-418. Zoological Survey of India, Calcutta.
- Ripley, S.D. 1982 . A synopsis of the birds of India and Pakistan. Bombay Natural History Society, Bombay.



## हिरन परिवार—संक्षिप्त जानकारी व विशेषताएँ

ए.एस. नेगी

### प्रस्तावना

ऑक्सन (Oxen), भेड़, बकरी, एण्टीलॉप, हिरन (Deer), सुअर, जिराफ, ऊँट तथा दरियायी घोड़ा, खुरवाले जानवरों के आर्टिडैक्ट्यूला (Artidactyla) ऑर्डर (Order) के अन्तर्गत आते हैं जो अधिकांश खुरवाले जानवरों का समूह है। इन्हें सम-खुर (Eventooed) वाले जानवर भी कहा जाता है। इस समूह को छोटे समूहों (Families) में बांटा गया है जिनमें सबसे बड़ा समूह (Family) बॉविडी (Bovidae) है। (Bovidae) परिवार में ऑक्सन, भेड़ व बकरी (पालतू या जंगली) तथा एण्टीलॉप्स तथा गजल्स आती हैं। सरविडी Cervidae परिवार में सब प्रकार के हिरन (Deer) आते हैं।

### पैरों की बनावट

खुर वाले जानवरों की बनावट समझना आवश्यक है। यह जानवर प्राथमिक उपभोक्ता स्तर के हैं। मांसभक्षी जानवरों के पंजे आक्रमण करने के हथियार के रूप में प्रयोग किये जाते हैं तथा बन्दर व लंगूर के हाथ-पैर टहनियों को पकड़ने के लिये बने होते हैं, परन्तु इन शाकाहारी जानवरों के पैरों का काम केवल चलने-फिरने व भागने के काम आते हैं। खुर वाले जानवर अपने टखनों के अग्रभाग (Tip of their toes) पर चलते हैं। इससे उनकी गति बढ़ जाती है तथा जमीन के सम्पर्क में कम से कम भाग रहने के कारण प्रतिरोध भी न्यूनतम हो जाता है। खुरवाले जानवरों में टोज (Toes) की संख्या 4 से अधिक नहीं होती। अधिकांश में कुल दो ही टोज क्रियाशील होती हैं। इस प्रकार क्रियाशील टो की हड्डी प्राकृतिक रूप से लम्बी व मजबूत हो

जाती है। और शेष टोज लुप्तप्रायः हो जाती है। घोड़े तथा गैंडे में केवल बीच वाली तीसरी टो की हड्डी बड़ी व मजबूत हुई है जबकि दो खुरवाले अधिकांश जानवरों जैसे ऑक्सन, भेड़, बकरी, एण्टीलॉप, हिरन, ऊँट व सुअर आदि में तीसरी व चौथी टो अन्य की अपेक्षा लम्बी व मजबूत हुई व शेष 3 टोज लगभग समाप्त हो गई। सभी खुरवाले जानवरों में प्रथम टो नदारत है। दूसरी व पांचवी टो या तो होती ही नहीं है या बहुत छोटी होती है, जैसे गाय, भेड़, बकरी आदि में देखी जा सकती है। तीसरी व चौथी टो अर्थात् बीच की दो टोज पूर्णतः विकसित होती हैं, आकार में बड़ी तथा एक जैसी होती हैं। शरीर की मध्यरेखा इन्हीं के बीच से गुजरती है। इनके बाहर मजबूत खुर होते हैं, जिनकी बनावट ऐसी होती है कि दोनों खुर ऐसे प्रतीत होते हैं, जैसे एक को ही दो भागों में बांटा गया हो। इनके पैरों की हड्डियों की बनावट भी इस तरह होती है कि इन्हें हर तरह की जमीन पर चलने में मदद मिल सके। इनके पैरों की इस तरह की बनावट से ही यह जानवर अपने दुश्मनों से बच पाते हैं तथा मैदान, चट्टान, दल-दल आदि सभी प्रकार की जमीन पर भोजन की खोज में लम्बी दूरी तय कर सकते हैं।

### दांतों की बनावट

खुरवाले जानवरों का मुख्य भोजन घास तथा अन्य मोटी वनस्पति है जो पाचन योग्य होने से पूर्व अच्छी तरह चबाया जाना आवश्यक है। इन जानवरों के अनेक दुश्मन होने के कारण यह सम्भव नहीं है कि ये लम्बे समय तक घास के खुले मैदानों में रहकर घास व टहनियों को चबाते



रहें अतः इन्हें अपना भोजन कम से कम समय में पेट के अन्दर डालना पड़ता है, जिसकी मात्रा भी अधिक होती है। इस पदार्थ को जानवर सुरक्षित स्थान पर जुगाली करके पचाने योग्य बना सकते हैं। इन बातों के अनुरूप ही इनके दांतों की बनावट होती है। अतः इन जानवरों के चबाने वाले दांतों (Grinding teeth) की बनावट इसी के अनुरूप होती है। इन जानवरों के चबाने वाले दांत चौड़े धारदार व मजबूत इनेमल के बने होते हैं। ऊपरी जबड़े के अग्रभाग में इस समूह के किसी भी जानवर के इन्सिजर (Incisor) नहीं होते हैं। इनके स्थान पर खाली जबड़ा रहता है। ऊपरी जबड़े में कैनाइन टीथ (Canine teeth) भी या तो Rudimentary होते हैं या होते ही नहीं हैं। निचले जबड़े में इन्सिजर व कैनाइन दोनों प्रकार के दांत होते हैं, जो एक जैसे ही होते हैं। घास मुंह में जीभ के द्वारा ठोंसा जाता है जो खुरदुरी होती है।

### उदर की बनावट

इनके उदर में चार अलग-अलग खाने होते हैं। पहले व सबसे बड़े खाने में जल्दी-जल्दी निगला हुआ घास रहता है जो यहाँ कुछ कोमल होकर छोटे-छोटे ग्रासों में वापस मुंह में आता है और जुगाली से अच्छी तरह से चबाने के बाद यह दूसरे खाने में जाता है जिसे Reticulam कहते हैं, यहाँ पर इसे अच्छी तरह से दबाने के बाद यह तीसरे व चौथे खाने में जाता है। वास्तविक पाचन चौथे खाने में होता है।

### इस प्रकार खुर वाले जानवरों के मुख्यतः निम्न समूह हैं:

जंगली ऑक्सन, शीप व गोट— उदाहरण— वाइल्ड ऑक्सन— गौड़ या भारतीय बाइसन, बान्टेंग, याक तथा जंगली भैंसा। शीप— शीप, मार्कोपोलो शीप, नयन व भरल।

गोट— वाइल्ड गोट, आइबेक्स, मारखोर, नीलगिरी थार व हिमालयन थार।

हिरन व मृग (Deer and Antelope) जुगाली करने वाले जानवर हैं (True Ruminants) जुगाली करने वाले जानवरों की विशेषता है, ऊपरी जबड़े में काटने वाले दांतों (Incisors) की अनुपस्थिति, चार खानों वाला उदर तथा सींगों की उपस्थिति।

### सींगों की उपस्थिति

बोविडी परिवार के सभी जानवरों के सींग दो भागों में होते हैं। खोपड़ी से उगती हुई ठोस हड्डीनुमा कोर तथा उसके बाहर का आवरण। बाहरी आवरण खोखला होता है जिसे पूरा हटाया जा सकता है। इसीलिये इनको खोखले सींग वाले जानवर भी कहते हैं।

बोविडी के विपरीत सरविडी (Cervidae) परिवार के जानवरों जिनमें हिरन आते हैं, ऐसे जुगाली करने वाले जन्तु हैं जिनके सींग ठोस होते हैं। बोविडी परिवार के जन्तुओं के सींग उनके पूरे जीवन काल तक चलते हैं। भले ही बाहरी आवरण कट-फट सकता है। सरविडी या हिरन परिवार के जन्तुओं के सींग एक निश्चित अवधि में गिर जाते हैं तथा तत्काल नये सींग भी उग जाते हैं। नये उगने वाले सींगों के ऊपर आरम्भ में खाल का आवरण होता है जो बाद में रगड़कर हटा दिया जाता है। बोविडी के अधिकांश सदस्यों में नर व मादा दोनों में सींग होते हैं परन्तु हिरन परिवार में अधिकांशतः नर में सींग होते हैं।



गोट एण्टीलोप—

उदाहरण— गोरल, सेराऊ, ताकिन व तिबतन एण्टीलोप।

एण्टीलोप्स व गजल—

उदाहरण— नीलगाय, चौसिंगा, चिंकारा, काला हिरन।

डियर या हिरन—

उदाहरण— सांभर, कश्मीर स्टैग या हंगुल, थामिन या मनिपुर डियर या ब्रो-एण्टलर्ड डियर, बारासिंघा, चीतल, पाड़ा, इण्डियन चिवरोटिन, काकड़, कस्तूरा मृग।

**डियर व एण्टीलोप में अन्तर निम्न प्रकार किया जा सकता है:**

**डियर**

**एण्टीलोप**

ठोस सींग होते हैं जिन्हें एण्टलर कहते हैं। निश्चित अवधि पर एण्टलर गिरते हैं तथा पुनः उग आते हैं। नये एण्टलर कोमल खाल से ढके होते हैं, जिसे वेलवेट (Velvet) कहते हैं।

सींग केवल नर में पाए जाते हैं तथा अधिकांशतः सींगों में शाखाएँ होती हैं, जिन्हें टाइन्स कहते हैं। अलग-अलग प्रकार की प्रजातियों में टाइन की संख्या कम या ज्यादा होती है।

कस्तूरा मृग के अलावा किसी में भी गॉल ब्लाडर नहीं पाया जाता है।

चारों पैरों में ऊपर का छोटा खुर (Lateral digit) पूरी तरह विकसित होता है।

अधिकांशतः घने जंगलों में पाया जाता है।

उदाहरण— चीतल, सांभर, हंगुल या कश्मीरी स्टैग, बारासींघा, मुंटजैक, पाड़ा, मनिपुर डियर या थामिन या ब्रो-एण्टलर्ड डियर, कस्तूरा मृग।

खोखले सींग होते हैं जिनका अन्दर का भाग ठोस हड्डी का बना होता है तथा बाहरी आवरण खोखला होता है जो पूरी तरह हटाया जा सकता है। वही सींग पूरे जीवन काल तक चलते हैं भले ही बाहरी आवरण कट-फट सकता है।

सींग बहुधा नर व मादा दोनों में पाये जाते हैं तथा केवल दो ही सींग होते हैं।

सभी प्रजातियों में गॉल ब्लाडर पाया जाता है।

लेटरल डिजिट कम विकसित होता है।

मरुस्थली भूमि तथा खुले मैदानों में अधिकांशतः पाये जाते हैं।

उदाहरण: काला हिरन, चिंकारा, चौसिंगा, नीलगाय, चिरु या तिबतन एण्टीलोप।

नोट: गोरल (घुरड़), सेराव व ताकिन, गोट एण्टीलोप की श्रेणी में आते हैं, जिनके गुण गोट तथा एण्टीलोप दोनों समूहों के जन्तुओं से मिलते हैं।



### हिरन परिवार की कुछ और विशेषताएँ

हिरनों में सींग को एण्टलर कहते हैं। यह केवल नर में पाये जाते हैं आरम्भ में यह वेलवेट की घुंड़ी के समान उगते हैं। बच्चे जब बड़े होने लगते हैं तो पहले वर्ष केवल दो लम्बे एण्टलर निकलते हैं जिन्हें स्पाइक्स (Spikes) कहते हैं। अगले वर्ष में इन्हें गिराकर जो एण्टलर निकलते हैं, इनमें शाखाएँ निकलती हैं, जिन्हें टाइन्स (Tines) कहते हैं। सांभर, चीतल व पाड़े में प्रत्येक एण्टलर से तीन टाइन निकलती हैं। हंगुल, बारासिंघा तथा थामिन में एण्टलर की कई शाखाएँ होती हैं। माथे में जहाँ से एण्टलर निकलते हैं, उसके थोड़ा ऊपर एक रिंगनुमा ग्रोथ होती है जिसे बर (Burr) कहते हैं। हंगुल में एक-एक टाइन ठीक बर के ऊपर होती है जिन्हें ब्रोटाइन कहते हैं। ब्रोटाइन के ऊपर दो स्पष्ट टाइन होती हैं, निचली को बेज (Bes) व कुछ ऊपर वाली को ट्रेज (Tres) या त्वलंस कहते हैं। एण्टलर के सबसे ऊपर के भाग में टाइन का एक समूह होता है जिसे क्राउन कहते हैं। अधिकांशतः हंगुल में प्रत्येक एण्टलर में 5 शाखाएँ (Points) होती हैं। बारासींघा में Points की संख्या 20 तक हो सकती है। हर वर्ष एण्टलर के गिरने के बाद अधिक बड़े एण्टलर उगते हैं परन्तु कुछ उम्र के बाद उनका आकार घटने लगता है।

नया उगा हुआ एण्टलर खाल के अन्दर रहता है। खाल मुलायम व रॉयेदार होती है जो वेलवेट (Velvet) की तरह दिखाई देती है। यह खाल बहुत कोमल होती है जिसमें अनेक खून कोशिकाएँ रहती हैं तथा आसानी से चोट खा सकती हैं। इस समय स्टैग घने जंगलों से खुले घास के मैदानों में आ जाते हैं तथा अकेले रहते हैं। अपरिहार्य रूप में आपस में लड़ाई होने पर वे

अगले पैरों को खड़ा करके लड़ते हैं, जैसे मादाएँ (Does) लड़ती हैं।

जब एण्टलर का विकास पूर्ण हो जाय तो जहाँ से वे उगते हैं ठीक उसी के ऊपर एक ठोस हड्डी की रिंग बन जाती है जिसे "बर" कहते हैं। यह धीरे-धीरे संकरी होती है तथा खून कोशिकाएँ सूख जाती हैं जिससे कोमल खाल सूख जाती है जिसे स्टैग पेड़ों व झाड़ियों पर सींग रगड़ते हैं जिसके निशान जंगल में दिखाई देते हैं। बारासिंघा लम्बी घास से ही सींगों को रगड़ देता है। चूँकि यह अधिकांशतः घास के मैदानों में ही रहता है।

एण्टलर का कठोर होने तथा साफ रहने का समय इनके Rutting season से मिलता है। एण्टलर दुश्मनों से रक्षा के अलावा मादाओं को पाने के लिये आपस में लड़ने के उत्तम साधन हैं। रटिंग सीजन के बाद हिरनों के एण्टलर कुछ समय के लिये गिर जाते हैं। गिरने का समय नर हिरनों की उम्र पर निर्भर करता है। कम उम्र के नर अधिक उम्र वालों से जल्दी एण्टलर गिराते हैं। एण्टलर गिराने का समय अलग-अलग लोकालिटी में अलग-अलग हो सकता है। यह भी कहा गया है कि अच्छे घास वाले क्षेत्रों में एण्टलर जल्दी गिर जाते हैं। एण्टलर उगने का समय सभी जगह घास की बहुतायत में उपलब्धता के समय से मिलता जुलता है। घास हिरनों का मुख्य आहार है जिसमें कैल्शियम की बहुतायत होती है यह भी सम्भव है कि कैल्शियम की अधिक मात्रा को शरीर से निकालने के लिए एण्टलर का गिरना आवश्यक हो। मादा में यह बच्चे के जन्म व दूध पिलाने से निकल जाता है। हिरन का बचाव उनके बड़े-बड़े एण्टलर से कम तथा उनकी सूंघने, देखने व सुनने की तीव्र शक्ति तथा फुर्ती से भागने की क्षमता में अधिक है।



हिरन केवल घने जंगलों तथा घास के मैदानों में पाए जाते हैं तथा मरुस्थली प्रान्तों में कभी नहीं पाए जाते हैं। पुरानी दुनिया में हिरन यूरोप व एशिया में ही पाए जाते हैं तथा सहारा के दक्षिण की तरफ अफ्रीका में अनुपस्थित हैं। नई दुनिया में पाई जाने वाले हिरनों की केवल 3 प्रजातियां पाई जाती हैं। नई दुनिया में पाई जाने वाली हिरन की शेष प्रजातियां बिल्कुल भिन्न प्रकार की होती हैं।

बारासींघा तराई की दलदली भूमि में तथा मध्य प्रदेश के सूखे वनों में भी पाया जाता है परन्तु इनकी बनावट में भिन्नता के कारण यह दो भिन्न उप जातियां कही जाती हैं।

अधिकांश हिरनों की खाल का रंग मौसम के साथ बदलता है। इनकी ग्रीष्म कालीन खाल (कोट) हल्के रंग की तथा शीतकालीन गहरे रंग की होती है। यह जंगल के रंग के साथ मेल खाने के लिये होता है। ग्रीष्मकालीन कोट अधिकांशतः सफेद धब्बे लिये होता है, जैसे हंगुल के बच्चे, मादा तथा अवयस्क नरों में गर्मियों में सफेद धब्बे होते हैं। इसी प्रकार बारासींघा तथा पाड़े में भी पाया जाता है। यह जानवर को छिपाने में सहायक होता है। चीतल जो भारत के वनों में बहुतायत में पाया जाता है, में यह धब्बे पूर्णतः विकसित होते हैं जो शरीर के आकार को तोड़कर दुश्मनों से बचाव का उत्तम साधन है। हिरन की बड़ी प्रजातियों में वयस्क प्रजनन काल के अतिरिक्त अलग झुंड में रहते हैं तथा मादाएँ, बच्चे तथा अवयस्क नर (2 या 3 वर्ष की उम्र के)

अलग झुंड बनाकर रहते हैं। मादा झुंड का नेतृत्व करती हैं। मादाएँ आपस में लड़ती नहीं हैं। बच्चे को जन्म देते समय मादा एकान्त में जाकर सुरक्षित स्थान पर बच्चे को जन्म देती है तथा कुछ ही दिन बाद झुंड में मिल जाती है। छोटी प्रजातियों जैसे काकड़, कस्तूरा मृग व पाड़ें बड़े झुंड में नहीं रहते हैं। प्रजनन काल में नर मादा व छोटा बच्चा साथ रहते हैं अन्यथा अलग ही रहते हैं।

उत्तरांचल के तराई-भाबर क्षेत्र व कम ऊँचाई के हिमालय व शिवालिक पहाड़ियों में चीतल, सांभर, पाड़ा व काकड़ पाये जाते हैं। हरिद्वार वन प्रभाग में एक स्थान पर (झील मिल ताल) बारासिंघा भी पाया जाता है। इस क्षेत्र को इसी कारण प्रदेश सरकार ने संरक्षण आरक्ष (Conservative Reserve) घोषित कर दिया है। हिमालय क्षेत्र में अधिक ऊँचाई पर पाया जाता है। (3000 मीटर के आस-पास व उससे अधिक ऊँचाई पर)। चीतल 1000 मीटर की ऊँचाई तक सभी जगह मिलता है व सबसे खूबसूरत हिरन है। संख्या में भी सर्वाधिक है। पाड़ा कुछ ही स्थानों पर मात्र घास के मैदानों में पाया जाता है। कार्बेट पार्क में ढिकाला चौड़ में सर्वाधिक संख्या में हैं। सांभर उत्तरांचल में पाये जाने वाला सबसे बड़ा हिरन है जो तराई से लेकर 2000 मीटर से भी अधिक ऊँचाई तक मिलता है। शेर का सबसे प्रिय भोजन सांभर है। काकड़ भी 2000 मी० की ऊँचाई तक पाया जाता है व उत्तरांचल में पाए जाने वाला सबसे छोटा हिरन है।



# From the Archives of "Cheetal"

## Human Aspects in Wildlife Habitat Management in India

N.K. Sinha\*

### Introduction

Animals and plants living in their natural habitat of adaptation constitute the wildlife. The habitat includes both its biotic and non-biotic surroundings. The wildlife habitat is a complex biological and physical environment that provides food, shelter and other living requirements. Thus, the organisms and their habitat have an intricate relationship. The wildlife habitat is also being exploited by the human population in vicinity for their day to day needs. The human dimension in the habitat utilisation should be taken care of for the success of every wildlife habitat management plan. Human interference may retard, hasten or arrest the process of natural equilibrium in an unpredictable manner. Regression leading to the impoverishment of species starts with the indiscreet overuse of habitat.

### History of Wildlife Management in India

India is well known for its rich wildlife since ages but, unfortunately from centuries, the human interest was mainly to kill these animals for some wild pleasure and excitement and to destroy their natural habitat. There has been an overall attitude of neglect and apathy towards wildlife particularly on the part of planners, who considered wildlife and its habitat conservation, as antagonistic to development. Large patches of forests were

sacrificed in the name of development, without raising new forests. Uncontrolled grazing and exercise of rights by ever increasing population, has denuded the entire wildlife habitat. The wildlife management in India has been the responsibility of foresters, who have sometimes been accused of neglecting, or even of giving stepmotherly treatment to wildlife. On the contrary, there was a constant advancement by the Forest Department in the wildlife and its habitat management and formulation of strategies for future.

The twentieth century started with a feeling that our wildlife resource is inexhaustible and management was mainly concerned with the protection of certain species that were useful to mankind. In the first quarter, the Forest Department's main thrust was to consolidate the legal and silvicultural management status of the reserved forests. The work suffered heavily because of inaccessibility, lack of demand for timber and the prevailing totalitarian controls, which ensure effective fire control and efficacious grazing regulations. There was also marginal land or wasteland in the villages, which were used as pasture. These marginal lands provide substantial supplement to the wildlife habitat in the adjacent forests. The elimination pressure upon the wildlife itself was moderate as only

---

\*This article by Mr. N.K. Singa (Zoological Survey of India, Dehradun) was published in Cheetal Vol. 33 (1993) No.1 (Page 1 to 9) this is being reprinted due to its curretn relevance in wildlife management.



the privileged class had access to hunting. The totalitarian control never permitted the rural and tribal hunting to grow to an alarming proportion.

In the second quarter, the rising human and cattle populations increased pressure on forests which resulted in the declining trend in the status of wildlife. The Indian Forest Act, 1927 and the Indian Game Act, 1935 were amended to provide better legal protection to the declining wildlife. The outlook towards wildlife and its habitat started changing and wildlife was considered as a product of land and concepts like habitat management, carrying capacity and sustained yield etc., were developed.

In the post-independence era the totalitarian control crumbled. Private forests were transferred to the Forest Department without simultaneous transfer of authority which led to rapid liquidation of these forests for agriculture. In addition, a large portion of forest land was also officially released for agriculture, irrigation power and other developmental purposes. This resulted in drastic reduction and fragmentation of wildlife habitat and in impoverishment of several species. In a quick and bold measure for protecting the depleting wildlife and its habitat from further loss, a large number of Wildlife Sanctuaries and National Parks were created at suitable pockets to cover the representative types of flora and fauna. For the establishment of ecological linkage, boundaries of existing Sanctuaries and Parks were revised to make them viable units, so that as far as possible there should be a continuous stretch of forests in different habitat types in various biogeographical regions in the country. Several special schemes to protect the habitat and

specific species of wildlife were started in seventies, such as, Projects for Tiger, Lion, Hungul, Manipur Deer, Musk Deer, Rhinoceros, Crocodiles and Gharials. Under these schemes, significant success has been achieved. It has been realised that every species of animal and plant depends on other species for their own survival. Thus, the concern for wildlife has become the concern for man himself. The awareness for the conservation of wildlife habitat has further advanced and concepts like environmental protection, gene pool progeny and biosphere reserves developed. New Laws have been enacted such as Wildlife (Protection) Act, 1972, which provides protection to rare and endangered species and regulate trade and export, and the Forest Conservation Act, 1980, which forbids diversion of forests into non-forest areas. The planned management of wildlife and its habitat is, therefore, a developing discipline. However, the level of research and field practices, in such a short duration, is commendable. The desired public opinion for conservation has, however, not been achieved and the management of wildlife habitat has remained the concern of the Government only. The common man has not appreciated the fact that the protection of fauna and flora are ultimately going to help him in meeting his day to day needs. No conservation programme can bring any lasting result without the involvement of the public at large. The policy decisions about management of wildlife habitat should also incorporate the aspirations and need of the people who are living in the surrounding areas and also the co-users of wildlife habitat. This is essential for the success of any management plan.



### **Role of Wildlife Manager**

The wildlife management in India as also in many other developing countries is preservation oriented. It has been mainly the concern of Government Departments entrusted with the task and a few more organisations who have got special love for protection of nature and natural resources. The remote rural-folk living close to wildlife habitat are in general poor and poverty ridden. Their dependence on forest produce is a compulsion for their survival and for meeting their day to day needs of fuel, food, fodder etc. These rural people usually overhunt and overfish in the wildlife habitat thus causing great damage to the ecological balance. It is their sheer need of life that the daily survival decisions disrupt their own life support system, impair ecological process and destroy the genetic resources. The rural population should be associated and explained the beneficial role of management practices. The emphasis should be given on the continuance of benefits from the wildlife habitat by adopting balanced management. There is a feeling among the wildlife habitat managers that the rural population are the most serious decimating agents of wildlife and its habitat, and develop an attitude which is antagonising to them. This attitude creates conflicts and instead of understanding the helplessness of the rural-folk, the wildlife managers accuse them of becoming obstacles in the development.

The rural population should be trained to earn their livelihood without damaging the environment. It will be impossible to implement any wildlife habitat management plan without the integrated development of the surrounding villages. Therefore, the role of managers is very delicate and they have to function as a bridge

between the protection of habitat and its exploitation by the rural population. He has to keep a balance between the two objectives.

### **Evaluation of Human Needs**

The wildlife habitat management is the manipulation of interests of three components, i.e. man, land and wildlife (fauna and flora). In the past, while managing the wildlife habitat, the need and requirements of local population was completely overlooked and stress was only laid on the demands of different species of fauna and flora. This has resulted in the failure of achieving the required results. To overcome the shortcomings, the wildlife managers should understand the hardship and difficulties of the surrounding villages, who have suffered inadvertently in the past.

Suitable remedial methods should also be adopted in the management plan. Any wildlife habitat management plan cannot succeed, specially in a developing country like India, without the accommodation of requirements of rural-folk. To tackle the human dimension is the hardest and important operation of wildlife management which required skill and dedication. The human need should be identified and assessed. It should be specifically dealt with in the wildlife habitat management schemes.

### **Socio-Economic Development of Rural Areas**

The total geographical area of the country is 32,87,790 sq. km., of which 7,47,860 sq. km area of land is under various types of forests which includes vegetated forests, deserts, alpine wastes, lakes and estuaries (Panwar, 1992). These areas are all, either existing or having potential for developing into wildlife habitat. From the wildlife habitat, the animals take out their necessities of life such



as food, water and shelter. Similarly, the human population living in close proximity of forests, are in general poor and they subsist their living on the products of forests. The forests provide them food, building material and grazing ground for their livestock. By exploiting the forests for fruits, honey, fish and other minor products, the local populations supplement their earnings from agriculture and as daily wage earners of farm land. As they don't have more avenues to supplement their source of income, it is necessary to accommodate their needs in the future management plans. Otherwise, they are bound to frustrate all the conservation measures. It is utmost important to reduce the dependence of rural population on the forest by providing them with the alternatives.

The concentration of tribal-rural-population is in general high around National Parks and Wildlife Sanctuaries as compared, to other forested areas (Singh. 1982). These are also the highest concentration areas and strongholds of many endangered and rare species. It is difficult at this stage of our development to develop all the villages falling within or close to these wildlife areas. But to begin with, some villages should be selected for development.

For reducing their dependence on the forest and its produce, it is important to provide them alternatives to their needs, such as alternate cooking fuel in place of traditional firewood. The forest is being out-stripped at an alarming rate and by conservative estimates, though food will be available to eat, there will be no firewood to cook by the end of the present century. We must make concerted efforts for the development of social forestry for regular supply of firewood. Alternate source

of energy like biogas should also be encouraged in a large scale. The other measures adopted should be the improvement in the solar cookers for cooking food, improvement in the existing fire chulha for maximum use of energy of burning wood and extensive use of pressure cookers for conserving the energy.

Every village should be encouraged to develop its own pasture through social forestry for grazing their livestock. Besides, incentives should be given to replace uneconomical cattle with high yield breeds, which can be stall-fed. This will help in enough supply of dung for biogas and manure for agricultural fields. The pastures will also be prevented from over grazing

The design of houses should also be altered so that instead of thatching the roofs with grass, tin sheets or concrete be used. The saving in grasses will ultimately be used as cattle feed for stall feeding.

### **Damage to Crop by Wild Animals**

Individuals and large population of wildlife have always been a pest on human beings. More animal problems will occur because of continuous rise in the human population and need for more food. The growing human population has brought cultivation right upto the edge of the forest. This has created allurements to the wild herbivores for the green crop fields and carnivores to the livestock and poultry. This has resulted in confrontation between conservationists and agriculturists which ultimately results in trapping or killing of our precious wildlife, which venture outside their boundary. The loss of even small quantity of crop by the wild animals is a matter of great concern to the poor farmers. There were a



few affluent farmers, who have acquired land close to forested areas, have all the resources to eliminate the venturing wild animals without any compunction whatsoever. It is desired for the wildlife management to evaluate the seriousness of the problem and take remedial measures to reduce the antagonism to the wildlife by the villagers. The administrative and human emotional factors must be examined since the most difficult part of animal damage-control-operation are usually the people's problem. This is a difficult proposition and answers should be acceptable both administratively and socially.

### **Principles of Animal Control**

For controlling the wild animals from entering the crop fields, the wildlife habitat management plan should be drafted in such a way that the damage-prone area of crop fields should become less attractive to the wild animals. This can be achieved by improving the quality and quantity of food, specially grasses, available in the wildlife habitat. Experiments with success have been carried out in Dudhwa National Park (U.P.), where soft grasses were cultivated on higher areas. This attractive grazing ground within the Park has prevented swamp deer and other artiodactyles from venturing in the adjoining crop fields where previously they were mercilessly killed by the farmers. Now the artiodactyles stay back within the Park and both the wildlife managers and farmers are happy with this type of situation.

No serious research on the animal damage-control-measures has been done even in developed countries. Similarly, no effective methodology has been developed to combat the problem. The ecology of man modified environment is not well understood.

Time has now come to develop the unharmed approach to the wildlife damage problem for the execution of sensible environmental management.

### **Remedial Measures**

The wild animals can be prevented from entering into the crop fields broadly by two methods, i.e. biological control and by the mechanical and electrical controls. Biological control is the reduction of population by use of chemosterilants for causing temporary, and in some cases permanent, sterility among the erring wild animals.

The mechanical and electrical controls are most effective and stable way of preventing wild animals from entering in the crop fields. But they are expensive. The wild animals may be prevented from entering into crop fields by fencing or by some other way. Their number may be reduced by migrating the surplus animals to other areas or by reducing their number by killing the venturing animals. The electrical and electromagnetic fencing is a very effective way of controlling their entry. But there is always danger of hazards in this type of proposition. The other methods of scaring the wild animals are the use of chemical repellent and frightening devices such as scaring them with bursting of crackers, gun shots, use of sirens, belling and other light and frightening devices. Some of these methods are already being practised in our country in a limited way. There is a need to upgrade this sophisticated technology with use of minimum lethal controls.

The other important aspect which can be incorporated in the management plan is the insurance of crop against damage by wild animals. If the scheme works then the main irritant in the wildlife habitat management can



be solved. The management plan should also incorporate the methodology for making prompt payment and adequate compensation for the loss or damage to the crop.

The other important shortcomings in the wildlife habitat management is the menace of cattle-lifting and man-eating by the large carnivores. This menace questions the credibility of management practices which increases the population of carnivores. Although there is provision of compensating for every cattle and human loss, the compensation so paid is insufficient. Due to administrative delays and inadequate payments, the whole purpose of compensating the loss gets defeated. The menace of cattle-lifting and man-eating by the large carnivores specially tiger and leopard, has been on the increase in some of the National Park areas. For instance in Dudhwa National Park because of increase in the population of tiger, the carrying capacity of the wildlife habitat has become inadequate. The extension of crop and sugarcane fields right upto the edge of the forest has allured the carnivores to venture outside the Park. These animals sometimes encounter and kill cattle and human beings in these areas. By regular loss of cattle and human beings the rural population living close to these areas have become serious critics to the wildlife habitat management practices. The infuriated villagers fed up with the killing of their near relatives, reportedly harassed the Wildlife Warden in Dudhwa National Park. The villagers also reportedly threatened to tie the warden in the area, so that he can become a victim of man eater, and even offered that after the warden had been killed by the tiger, his family will be compensated with the same amount as the Government is paying to the members of the

deceased villagers (Singh. 1982). This is a grim situation and every effort should be made for capturing the erring carnivore. If it is not possible, then there should not be any hesitation in shooting the animal for the safety and protection of human life. To sympathize with the aggrieved villagers who have either lost their cattle or near relatives, the compensation payment should be made promptly. At times, these villagers are reported to poison the carcass, so that the carnivore gets killed when it eats it and villager takes his revenge besides protecting the remaining cattle from the clutches of carnivores. By poisoning the carcass, there is always a danger that some other innocent animal may lose its life. If adequate compensation is made promptly, then this practice may perhaps be prevented.

### **Employment Generation for Local Population**

The wildlife habitat should also be developed into tourists resort by creating marked recreation zones. The local population in the surrounding areas should be encouraged to involve themselves in the development of tourism in the area. They should also be encouraged to engage themselves in supplying various necessities and requirements of the tourists such as food, vegetables, fruits, milk and local artefacts through Government agencies to avoid exploitation of the tourists by private operators. These villagers should be given all the opportunities to realise that the creation of special wildlife conservation area close to their villages is capable of giving them adequate dividends. They should be assured that, as feared, it is not going to deprive them of their traditional dependence in a different form. These villages are having surplus manpower and it should be utilized as manual



labourers for various jobs of the management such as construction, habitat improvement works, road repairs, fire protection and other casual works.

### **Shifting of Villages from National Parks and Wildlife Sanctuaries**

As far as possible, villages falling within the National Parks and Wildlife Sanctuaries should be shifted with great caution and consideration of various factors. The inhabitants living there have got emotional attachment to their area of living. Some have also misappropriated or extended their legal limits. The shifting of these villages, if undertaken, may create socio-economic and socio-ecological constraints. If at all any village has to be shifted to a new area it should be adequately developed beforehand with better facilities like proper accommodation grazing ground for their cattle, better developed agricultural fields, water supply, school, medical care facilities and above all their emotional security. In new village sites, the cottage industries should be encouraged with arrangements for marketing their products. After ensuring these facilities the actual shifting

should be persuaded with utmost tender care and consideration.

### **Closing Remarks**

The role of wildlife habitat manager is, therefore, a link between the policies formulated by the Government for the preservation of wildlife and its habitat and the local people with their needs. The management techniques and plans should take cognizance of the needs of the people and their compulsions for achieving better results. The managers have a tremendous responsibility for contributing to an understanding of proper human relationships with the wildlife and natural resources. For this, they have to spend more time with the surrounding rural population to understand their problems and explaining them the benefits of management, besides the preservation and propagation of wildlife. It should be clear that attempts of conservation cannot succeed without the involvement of local people. The goal of balanced development in which interests of local people and wildlife are both accommodated is not difficult to achieve, if a culture of clear vision is developed among the policy makers and executors.

### **Acknowledgements**

The author is thankful to the Director, Zoological Survey of India, Calcutta for encouragement. Thanks are also due to the Officer-in-charge, Northern Regional Station, Z.S.I., Dehradun for facilities and support and for kindly going through the manuscript.

### **References**

- Chaudhuri, S.R. 1982. Habitat evaluation. In *The Workshop on Techniques in wildlife Research and Management*, Kanha National Park: 1-4 (Cyclostyled).
- Howard, W.E. 1982. Animal damage control techniques. In *The Workshop on Techniques in Wildlife Research and Management*, Kanha National Park: 1-17 (Cyclostyled).
- Kurt, F. 1978. Cosio-ecological organisation and aspects of management in South Asian deer. *Threatened Deer*: 219-237. IUCN Publication.
- Panwar, H. S. 1980. Conservation oriented development for communities living in forested



regions of India. *Tropical Zoology and Development* 467-474. Kaula Lumpur.

----- 1982. Management of Wildlife habitat in India. In *The Workshop on Techniques in Wildlife Research and Management*. Kanha National Park: 1-23 (Cyclostyled).

Singh, V.B. 1982. Human Dimension in Wildlife management in India. In *The Workshop on Techniques in Wildlife Research and Management*. Kanha National Park: 1-9 (Cyclostyled).

Sinha N. K. 1988. Loss of Forest in Nepal on Indo-Nepal border, a case of grave concern for the ecosystem management in India. *Cheetal*, 29(1): 1-3.

Tilak, R. and Sinha, N.K. 1987. Some of the problems of management of Dudhwa National Park. *Cheetal*, 28 (2): 41-44.



# Cheetal

## Quarterly News

### Wildlife Preservation Society of India Organises Wildlife Photo Exhibition during wildlife week-2006.

A Wildlife Photo Exhibition was organised by the Wildlife Preservation Society of India Dehradun, during wildlife Week-2006, at its office, 7 Astley Hall. Wildlife Photographs of Mr. Rajiv Raj Mehta, member Uttaranchal, Wildlife Advisory board and life member of WPSI were the main attraction of the exhibition. Other themes on conservation were also presented as also the grand old B & W Photographs taken by Society members from time to time. The Exhibition was inaugurated by Mr. P.R. Sinha Director Wildlife Institute of India on 3<sup>rd</sup> Oct 2006 & was visited by Wildlife enthusiasts, Senior Forest Officials, FGd Trainees, students, members of the press, members of WPSI & others till 7<sup>th</sup> October 2006. This was first ever widely attended activity of the Society during recent past. About 50 to 60 visitors witnessed the exhibition every day.

### The Executive Committee of Wildlife Preservation Society of India meets & new members enrolled.

A meeting of the Executive Committee of WPSI was held on 23<sup>rd</sup> September 06 at its office, under the chairmanship of Mr. AS Negi, its Executive Vice President. Among other matters the Societies rejuvenation efforts were discussed. After renovation Society's office building at 7-Astley Hall Dehradun is now in a presentable form & the encroachment by a neighbour of its back room & backyard has been removed with police help. The Society's Registration under Societies Registration Act 1860 has been renewed after 1995 for a further period of 5 years from 10/10/05 vide renewal certificate No. 203/2006-07 dated 27/07/06.

We welcome the following life/annual/Institutional members who have joined the Society during this quarter.

#### Sl. No. Name of Member

#### Kind of Membership

1. Brig. Susheer Kumar Chaudhari
2. Director, Corbett Wildlife Training Centre Kalagarh
3. Rajiv Raj Mehta Hardwar
4. Dr Sanjay Shah Hardwar
5. Mrs Megha Panwar Dehradun
6. Sri Prateek Panwar Dehradun

Life Member.  
Institutionale member (annual)  
Life member.  
Life member.  
Annual member.  
Annual member



|                                             |               |
|---------------------------------------------|---------------|
| 7. Mrs Anjali Dixit Dehradun                | Annual member |
| 8. Mr. Sumit Sinha Dehradun                 | Annual member |
| 9. Lt Gen (Rtd) R.K. Jasbir Singh Dehradun. | Life member.  |
| 10. Mr Vrigubir Singh Dehradun.             | Life member.  |
| 11. Mr Rashvinder Singh Paunta Saheb (HP)   | Annual member |
| 12. Mr Gurvinder Singh Paunta Saheb (HP)    | Annual member |
| 13. Mr Lalit Jung Paunta Saheb (HP)         | Annual member |
| 14. Mr Bhagat Singh New Delhi               | Life Member   |

### **Wildlife Preservation Society of India undertakes Project for rediscovery of Himalayan Quail.**

The Wildlife Presentation Society of India has undertaken a Project for rediscovery of the critically endangard Himalayan quail *Ophrysis supercilliosa* (which was last seen in 1876), with the financial support from WWF-India. The site for rediscovery has been chosen as the Binog & Bhadraj Forest blocks near Mussoorie, which has been short listed by WII among few other sites in Uttaranchal, where there could be greater possibility of its occurance. A project proposal has been submitted to the Chief Wildlife Warden Uttaranchal in which provision is being made for joint efforts by WWF, WPSI, WII & Wildlife wing of Uttaranchal FD. WWF-India has pledged a financial support of Rs. one lakh out of which Rs. 25000/- has already been advanced to the Society Preliminary field survey has already been made & selection of field level team has also been made. Second site at Sherka Danda in Nainital Forest Division has also been proposed where efforts will be made simultaneously.

### **The Wildlife (Protection) Amentment Act 2006 enacted to clear way for formation of " National Tiger Censervation Authority and "Tiger & other Endangered species Crime Control Bureau"**

The Wildlife (Protection) Amendment Act 2006 has been. enacted by the Parliament in which chapter IV B has been inserted for creation of "National Tiger Conservation Authority" & Chapter IVC for creation of Tiger & other Endangered species Crime control Bureau". The provisions are aimed at conservation of Tiger across the country in the tiger project areas & other tiger bearing areas & controll of wildlife crime, which is second only to international crime in drug smuggling in value.



## Annual Research Seminar of Wildlife Institute of India Held

The Annual Research Seminar of Wildlife Institute of India Dehradun was held in the Institutes Seminar hall on 21 & 22 September 2006. The inaugural session was chaired by Mr RPS Katwal IFS, Additional Director General of Forests, Ministry of Environment & Forests Govt. of India & the Technical Sessions were Chaired by Mr. V.B. Sawarkar, ex-Director WII & Chairman TRAC WII. The main presentations were on Molecular genetics & Forensic Studies of large cats, Vegetative Studies, Habitat Monitoring, Biodiversity assessment, Avifaunal & angulate studies etc. The following five research papers presented in the ARS were adjudged best for rewards.

| Name of Research Fellow | Rank | Topic                                                                                                               |
|-------------------------|------|---------------------------------------------------------------------------------------------------------------------|
| 1. Miss Neha Midha      | I    | Study of land use/land cover mapping vegetation assessment and river dynamics in Dudhwa Tiger Reserve, U.P.         |
| 2. Mr. R. Jaipal        | II   | Birds Environment and Protected area network in Central Indian Highlands, M.P.                                      |
| 3. Mr. A. Haridhar      | III  | Status of Tiger & its prey species following relocation of human settlements in Chilla Range, Rajaji National Park. |
| 4. Mr. Vinay Bhargava   | IV   | Distribution patterns of <i>Cicindela</i> in Sambalbara Wildlife Sanctuary, M.P.                                    |
| 5. Mr. Gopi G.V.        | V    | Breeding patterns among colonial Water Birds in the Heronary at Bhitarkanika National Park, Orissa                  |

### This land is their land

***But learn from the Australian experience and withdraw the tribal bill.***

As someone who has spent several years working with aboriginal Australians, it is with great sadness that I watch the great efforts being undertaken to pass the tribal bill in India. Such measures have been tried before in Australia and they have comprehensively failed. Aborigines now hold rights over more than 15 percent of the Australian land mass, yet earn next to nothing from this. Why? Because the



granting of assets rarely comes with the transfer of knowledge and skills necessary to sustainably use those assets. What we in Australila failed to recognise, and what the current tribal bill does not address, is that acquisition of "land" is neither a means nor an end in itself for today's indigenous peoples.

The Australian experience stands as a dire warning not only to the conservationists who are up in arms over this legislation, but most importantly to the Indian adivasis themselves. Experience shows that transfer of land by itself leads to neither a reattainment of lost culture nor economic gains. In fact quite the opposite has occurred-previously productive land has been left desolate once placed in aboriginal hands. The problem has been a lack of education, training and support for aboriginal people to conduct sustainable development on the land coupled with a lack of proper incentives. Aboriginal leaders point out that what aborigines really want as first priorities are education and jobs. Transfer of land plays no role in this.

Coming to this understanding has cost Australia dearly. The Australian people and government have wasted tens of billions of dollars in trying to make up for the disastrous historical treatment of aboriginal Australians through monetary handouts and land rights. The aim has been both justice and economic development. Our hope was that today's aboriginal people would somehow miraculously return to their ancient way of life, which was stolen from them, while enjoying the health and service benefits of a modern economy. Depressingly, not only have these policies failed to deliver justice and financial well-being they are now widely held to have made matters worse. At a time where Australia has risen to be one of the richest countries in the world, aboriginal development indicators have steadily declined. Male life expectancy in some communities has fallen to 55.

A few years ago I helped a community of aborigines negotiate with a mining company for the handover of farming land. I started out by asking the community what exactly they hoped to achieve from getting their land back. Far from wanting to revert to some "traditional living", they expressed a real desire that the land would help create business opportunities, fund their children's education and provide retirement income. However, this was not a community of farmers. They did not have the skills to generate cash from the land. In financial-speak they were in the wrong asset class. Our solution was a simple one: the aboriginal community agreed to take ownership of the land and immediately sell it to the highest bidding farmer. The deal included right of access for hunting and fishing so that current and future generations could maintain any cultural practices they desired. Additionally, the farmer would employ aboriginal labour. Using external advisors from the private sector, money raised from the sale was invested in trust funds for educational sholarships and start-up business grants. Today, this trust has already spawned two successful businesses.



The contrasts sharply with the usual experience, where aboriginal people take ownership of land that they are unprepared to handle: the vast majority quickly turns into economic wastelands. Previously functional farms and cattle stations lie unused and in ruin with machinery and other assets quickly sold off for short-term gain.; reducing the few long-term local jobs.

The lessons are clear. Reversing a past wrong is not always the best way to achieve justice because time has lapsed and the world around us has changed. Instead, our starting position should be to understand what it is that the adivasis of India want today, rather than what we think they need from yesterday. My bet is that like all humans, their first priority is a secure livelihood, and for their children to have even better opportunities than they did. The tribal bill achieves none of this. As it stands, this short-sighted measure is only promoting the permanent desecration of the land through mass deforestation for what will be a temporary cash injection. In fact, without education and proper advice on how to get a long-term sustainable outcome from the land, selling it to the highest bidder seems to be the most rational thing to do. But how exactly does this achieve justice ?

The Australian experience would instead suggest that we allow adivasis an inalienable right of access to forest for cultural practices (which does not require actual ownership), but look elsewhere for a solution to their economic livelihood. In short, ownership of land is no longer part of the real concern facing Adivasis and giving it back is certainly not part of the solution.

Australians are waking up to our problematic policies and the tide is now turning. A boriginal leaders are calling for an end to government handouts and want instead to engage with the modern economy while strengthening their own cultural practices. I hope that India can learn from our costly mistakes. Otherwise I fear that the decades of injustice heaped on the adivasis will surely just mount.

*Source-A write up by Gaurav Gupta\**

*The writer is a former Deputy Director of the Cape York Insititute, an aboriginal-led organisation which advises the Australian government on aboriginal policy Gupta. Gaurav@bcg.com*

### **Vanuatu happiest on earth**

THE MOST deservedly happy place on the planet is the South Pacific island nation of Vanuatu, according to a radical new index published on Wednesday.

The United Kingdom does not even make it into the top 100, according to the survey, which has been compiled to draw attention to the fact that it is not necessary to use up the earth's resources to achieve long life and happiness.

The innovative global meas-ure of progress, the Happy Planet Index, has been constructed by the New Economics Foundation (Nef) and Friends of the Earth



using three factors: life expectancy, human wellbeing and damage done via a country's "environmental footprint".

Vanuatu comes top because its people are satisfied with their lot, live to nearly 70 and do little damage to the planet. Zimbabwe takes bottom place in the table. Guatemala, El Salvador, Honduras and Colombia, countries that have experienced recent civil upheavals, all feature in the top 10 on the grounds that they do little environmental harm and manage comparatively high levels of satisfaction with life. The big industrial nations fare badly. The UK trails in 108th, below Libya, Gabon and Azerbaijan. The US is 150th and Russia is 172nd, near the bottom of the 178 nations for which statistics are available.

"Don't tell too many people, please," was the response of Marke Lowen of Vanuatu Online, the country's online newspaper, to the news that Vanuatu had topped the poll. "People are geneally happy here because they are very satisfied with very little. This is not a consumer-driven society. Life here is about community and family and goodwill to other people. It's a place where you don't worry too much.

The small population of 200,000 and the lack of aggressive marketing in what is essentially a subsistence economy were other factors which might have elevated the country, formerly known as the New Hebrides, to its top dog status, Lowen suggested.

"Most people here live day to day," he said. "The only things we fear are cyclones or occasional earth quakes." He added that people in Vanuatu considered themselves "caretakers" of the land.

The Happy Planet Index essentially divides the damage we do environmentally by the payback through life expectancy and satisfaction. No country does well on all three indicators but the survey shows that people can live long, fulfilled lives with out using more than their fair share of the earth's resources, says the foundation.

"It is clear that no single nation listed in the Happy Planet Index has got everything right," said Nic Marks, head of Nef's centre for wellbeing. "But the index does reveal patterns that show how we might better achieve long and happy lives for all, whilst living within our environmental means. The challenge is - can we learn the lessons and apply them?"

Life satisfaction varies greatly from country to country: questioned on how satisfied they were with their lives, on a scale of one to 10, 29% of Zimbabweans, who have a life expectancy of 37, rate themselves at one and only 6% rate themselves at 10. The Guardian

*Source-Hindustan Time New, Dehli, July 14, 2006.*



## **China tries to balance its tiger-breeding strategies and a thriving market in tiger bones**

Every crisis is an opportunity. While it may provide an opportunity to explore new options in an attempt to end the crisis, it may also blind people to alternatives, making them cling to failed policy options that have contributed to the problem. China and India reflect these contrasting approaches in their efforts to save the tiger.

Since the 1970s, India has enacted tough laws and mobilised huge resources to prevent hunting and trading of tigers, but the present debate over a tiger census is an indication that the policy of prohibition has not secured the future of tigers.

India has the largest number of tigers in the wild anywhere between two and four thousand. China probably has only 20 or 30 left in the wild. But it is in China that tiger parts, particularly bones, are in demand for treating severely arthritic patients as per traditional Chinese medicine (TCM).

China too adopted a similar policy of prohibition in 1993, but to no avail. In fact, the prohibition may have increased the suffering of Chinese patients who rely on TCM for relief. Conscious of this dual crisis, China is now experimenting with a range of radical policy options. The contrast with India-Where there are news reports of enlisting even the army to protect the tiger-could not have been more glaring.

In China, over the past decade, special tiger-breeding bases set up both under the public and private domain have virtually perfected the art. There are over 4,000 tigers in captivity in China today. and an effort is on to build a genetic profile, so that the number of pure sub-species could be documented and increased.

There are around 20 tiger-breeding facilities in China. While most are small, some are quite large. A 40-hectare tiger and bear park in the town of Guilin houses around 1,000 tigers in enclosures and cages. This is a major tourist destination, but the revenue from tourism is nowhere near adequate to meet the cost (\$4,000) of raising a tiger. The cost of the feed constitutes about 75 per cent of the total cost.

To meet the expenses, this park has been completely mortgaged to banks. Some years ago, it had to destroy a stock of tonnes of bones from dead tigers, because the cost of refrigeration was too high.

Yet, Chinese entrepreneurs and wildlife managers look optimistic. An adult tiger leaves behind about 12 to 15 kg of dry bones, which could sell for \$ 500-1,000 per kg in the market for TCM. Apart from that, the skin, claws and some other organs fetch another \$10,000. In addition, there is a constant demand for pure-bred sub-species of live tiger cubs and young adults from zoos and other establishments around the world. Also, the cost of feed can be reduced substantially by substituting commercial meat with low-cost wildlife. Tiger farms are eminently viable



financially. Clearly, commerce is no enemy of conservation.

China has, in fact, created a legal domestic market, and developed a computerised documentation system to track wildlife products like ivory and musk, from their stocks to manufacturing, retailing and customer documentation.

China is also experimenting with re-wilding techniques at a tiger valley in South Africa through public-private partnership. It hopes to master this art and train captive-bred tigers to survive in the wild.

There is a willingness in China to experiment even in internationally sensitive issues. From a limited domestic trade in tiger bones they hope to raise enough revenue to sustain their new tiger conservation strategies. The legal trade is expected to reduce the pressure on wild tigers, while helping Chinese patients. If this policy works, China may have, in a decade, over one lakh tigers in captivity and the natural death rate may be adequate to meet the demand for tiger bones.

For years, India has not discussed tiger conservation with China. The question is whether India will behave like a tiger, and bravely join China in search of new conservation strategies, or meekly sentence the tiger to inevitable extinction.

*Source - Guest column, India Today, July 17, 2006 by Barun Mitra, Director of Liberty Institute, New Delhi.*



# Cheetal

## Young Readers Section

### रामबांस—बहुउपयोगी आर्थिक 'कामधेनु'

\*कु० नेहा चमोली,

रामबांस का पौधा उत्तरांचल प्रदेश में बहुतायत से पाया जाता है तथा यहाँ के ग्रामीणों को स्वरोजगार प्रदान करने की प्रचुर क्षमता रखता है। विगत कुछ वर्षों में विशेषज्ञों, सरकारी तथा गैरसरकारी संगठनों ने इस पौधे से निकलने वाले रेशे का आर्थिक उपयोग समुचित प्रकार से किया है।

रामबांस का उपयोग कम्पोस्ट खाद, कीटनाशक, साबुन बनाने तथा कागज निर्माण में भी किया जाता है। रामबांस के रेशे की महत्ता कपास के रेशे से कम नहीं है। क्योंकि इस रेशे से कई प्रकार के मजबूत रस्सों का निर्माण किया जाता है। विगत वर्षों में रामबांस के रेशे से निर्मित हस्तशिल्प ने लोगों का ध्यान काफी आकर्षित किया है। इन हस्तशिल्पों के माध्यम से कई महिला संगठनों ने काफी आर्थिक प्रगति की है। रामबांस के रेशे से बनी पदों की लड़ियाँ, कोस्टर्स डाइनिंग मैट्स, लैम्प शैड्स, टेलीफोन मैट्स, वाल मैट्स आदि की माँग बाजार में काफी अधिक है। रेशा निकालने के बाद जो भी बचा पदार्थ या रेजिड्यू रहता है उससे खाद बनायी गयी है। इस बचे पदार्थ से एल्कोहाल, कुछ एसिड, कुछ दवाएं जैसे कौर्टिजोन आदि भी बनाये जाते हैं।

रामबांस एक बहुवर्षीय पौधा है। जिसमें लम्बी तलवार के समान पत्तियाँ गुच्छे दार तने पर बहुत कम दूरी पर लगी होती है। पत्तियों के अग्र भाग पर एक नुकीला कांटा लगा होता है। कुछ प्रजातियों में अग्रभाग के अतिरिक्त पत्तियों के दोनों ओर भी छोटे-छोटे कांटे होते हैं। इसकी पत्तियाँ मांसल होती हैं ताकि पानी का वाष्पोत्सर्जन कम हो व पौधा शुष्क स्थानों पर भी जीवित रह सके। यह पौधा समुद्र तल से एक हजार से तीन हजार मीटर ऊँचाई तक पाया जाता है। विश्वभर में इस पौधे की तीन सौ प्रजातियाँ पाई जाती हैं। इनमें से हाइब्रिड लीला में अधिक रेशा पाया जाता है। अगेव सिसलाना नामक प्रजाति से भी काफी रेशा मिलता है।

रामबांस का पौधा किसी भी प्रकार की मिट्टी में सरलता से उगाया जा सकता है। यद्यपि रेतीली व दोमट जमीन में अच्छी पैदावार उगायी जा सकती है। इसके अतिरिक्त बेकार व बंजर भूमि पर भी यह पौधा उगाया जा सकता है। रामबांस के पौधों की पत्तियाँ तीन से पाँच वर्ष की आयु में काटने योग्य हो सकती हैं। क्योंकि तब इसमें से प्रचुर मात्रा में रेशा प्राप्त किया जा सकता है। एक पत्ती में से उसके कुल भार का तीन से चार प्रतिशत तक सूखा रेशा प्राप्त किया जाता है। रेशे को निकालने के लिए डिथॉर्टिकेटर नामक मशीन का प्रयोग पिछले एक-डेढ़ दशक से किया जाने लगा



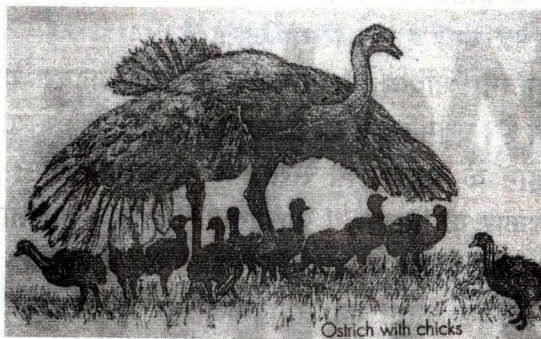
है। इस मशीन से काफी मात्रा में रेशा निकाला जा सकता है। इस रेशे को अच्छी प्रकार से धोकर व सुखाकर या तो इसके प्राकृतिक क्रीम सफेद रंग में ही उपयोग करते हैं या आकर्षक वस्तु हस्तशिल्प हेतु रेशे को विभिन्न रंगों में रंग लिया जाता है।

सबसे अधिक संभावना भविष्य में रामबांस के टो-फाइबर या बेकार रेशे से निर्मित हस्तनिर्मित कागज बनाने में है। वर्तमान में काफी कागज विदेशों से मंगाया जाता है। लेकिन कागज की खपत देश में अधिक होने के कारण नये संसाधनों से कागज बनाने का प्रयास किया जा रहा है। इस दिशा में भारत सरकार के विज्ञान व प्रौद्योगिकी विभाग व भारतीय वन अनुसंधान संस्थान (एफ0आर0आई0) द्वारा मिलकर भविष्य में कार्य किये जाने की योजना है। उसके अतिरिक्त रामबांस के रेशे से निर्मित कम्पोजिट वुड बनाने की संभावनाओं पर भी विचार किया जा रहा है। क्योंकि निरंतर घटते हुए वन संसाधनों ने वैज्ञानिकों को इस बात के लिये प्रोत्साहित किया है कि वन्य काष्ठ पर न निर्भर रहते हुए कुछ वैकल्पिक तरीकों से उन्नत किस्म की काष्ठ का उत्पादन किया जाए। एक अनुमान के अनुसार भारत में रामबांस लगभग 15000 हेक्टेअर भूमि में उगाया जा रहा है। जिसमें 2500 हेक्टेअर केवल उड़ीसा में है। इसके अलावा मध्य प्रदेश में 280 हेक्टेअर, पश्चिमी बंगाल में 750 हेक्टेअर, आन्ध्र प्रदेश में 750 हेक्टेअर, महाराष्ट्र में 725 हेक्टेअर, बिहार में 280 हेक्टेअर व कर्नाटक में 80 हेक्टेअर में इसकी खेती हो रही है। रामबांस रेशे की भारत में वार्षिक आवश्यकता लगभग बीस हजार टन आंकी गयी है। इस तरह वर्तमान में कुल रेशा उत्पादन आवश्यकता से कम पाया जाता है। इस आवश्यकता का कुछ आयात द्वारा पूरित किया जा रहा है। कहा जाता है कि वर्तमान प्रादयकता पूर्ति के लिए लगभग 25000 से 30,000 हेक्टेअर क्षेत्र में नए सिरे से रामबांस की खेती की जानी चाहिये।

रामबांस को भूमि कटान क्षेत्र में रोपण करके भू-स्खलन को रोका जा सकता है। इस दिशा में भारतीय वन-अनुसंधान संस्थान के वैज्ञानिकों तथा कुछ संस्थाओं द्वारा काफी कार्य किया गया है। रामबांस की उपयोगिता को देखते हुए कुछ संगठनों ने रामबांस की कुछ वांछित प्रजातियों का कई हेक्टेयर भूमि में रोपण किया है। जिनसे काफी मात्रा में रेशा प्राप्त भी होने लगा है। इस दिशा में अधिक शोध की और इन पौधालयों के आसपास ही रेशा संसाधन इकाइयों की स्थापना की आवश्यकता महसूस की जा रही है। राज्य सरकार रामबांस को राज्य की आर्थिकी का 'कामधेनु' मानकर चल रही है। विशेषज्ञ रामबांस को बहुउपयोगी बनाने का भी अध्ययन कर रहे हैं।



## What Makes a Bird a Bird?



Ostrich with chicks

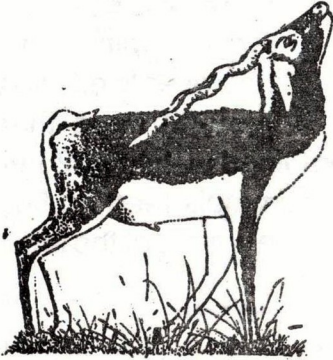
Ostriches, freely roaming over vast African grasslands, are the largest living birds, weighing about 135 kg (as much as two heavy adults). On the other hand the Bee Hummingbird of Cuba, is the smallest bird in the world. Just the size of a wasp, it weighs only 2 grams. The Great Indian Bustards, majestically moving in the extensive arid areas of Western Rajasthan or the grasslands of Madhya Pradesh, Maharashtra, Karnataka and Andhra Pradesh, are the heaviest Indian birds, weighing upto 18 kg (as much as a young child). The Scarletbacked Flowerpecker (7 cm) hardly bigger than a thumb, and found in many Indian states, is one of our smallest birds. It may be hard to believe that there is much in common between the two pairs of birds described above. But they share many characteristics, e.g. feathered bodies, forelimbs converted into wings, hollow bones, beaks, etc. This is because they are all birds.

Birds belong to a large group of animals called vertebrates (animals with a backbone). Birds make up a special class of vertebrates called Aves. Aves is the Latin word for bird. It is the root of other words such as avian and aviary. Fish, amphibians, reptiles and mammals are examples of other classes of vertebrates. Reptilian Relatives: Turtles, crocodiles and lizards are reptiles. It may sound strange but these have much in common with birds. Many scientists believe that about 160 million years ago birds evolved from small dinosaurlike reptiles. Even today birds do have several reptilian characteristics. For example, both birds and reptiles lay eggs: have partially hollow bones; have similar types of skulls and ear bones; and have scales covering parts of their bodies.

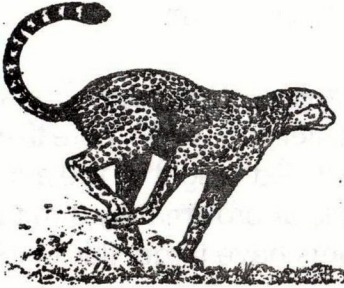
But as birds evolved, they became very different from reptiles. Many of the scales that covered their bodies become flatter and longer, evolving into feathers. Birds also developed horny beaks, but kept reptile-like scales on their legs and feet. In addition, their forelimbs i.e. front legs gradually evolved into wings.



## The Fastest Mammals



**Blackbuck:** One of the fastest herbivores. Can easily run at 70 km per hour for 15 km and can reach speeds of 90 km per hour. Being able to run fast for long periods of time helps blackbuck outrun their predators. Blackbuck are found only in India. Velavodar National Park in Gujrat and Point Calimere Sanctuary in Tamil Nadu have the largest populations of blackbuck today.



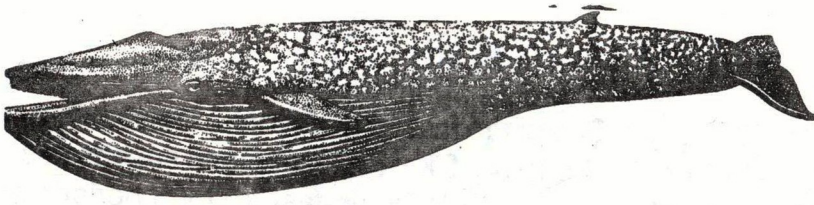
**Cheetah:** Fastest land mammal over a short distance. May run at speeds of over 100 km per hour for 150-300 m. Its explosive speed helps it catch its prey. Once common in the flat grasslands of India, the cheetah is extinct here today. It is still found in eastern and Southern Africa.



**Killer Whale:** Fastest marine mammal over a short distance. Can sometimes swim at speeds of up to 55 km per hour for about 450 m. Killer whales prey on fish, squid and marine mammals such as seals and other whales. Killer whales may be found in every ocean throughout the world.

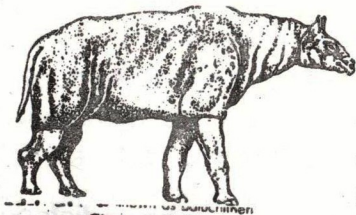


## The Largest Mammals



Blue Whale: Largest living animal in the world. Also one of the largest animal that has ever lived. May grow to more than

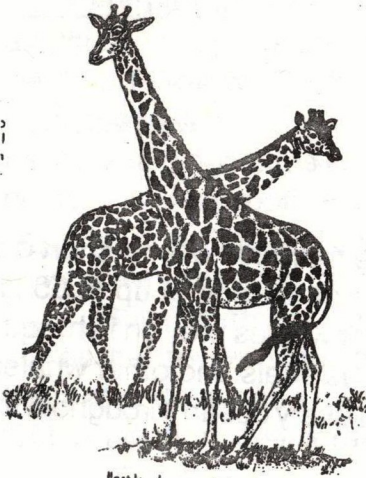
30 m in length and weigh more than 135 tonnes-the combined weight of 25 elephants or approximately 1600 men. These immense mammals feed on tiny, shrimplike sea animals called krill. Blue whales are found in the waters of the arctic and temperate oceans.



Indricotherium: Largest land mammal ever to exist. It was about 11m long and stood about 5 m tall at the shoulder. Indricotheriums lived 37 to 15 million years ago, at the same time as the earliest camels, squirrels and dogs. (Also known as Baluchitherium.)



African Elephant: Largest living land animal. This elephant may stand more than 3.2 m tall at the shoulder and weigh more than 6,000 kg-almost as much as the combined weight of 100 adult human beings. The Asian elephant is approximately 3 m tall and weighs about 5,000 kg. Elephants have large, thick legs that support their enormous weight.



Giraffe: Tallest land mammal. Can measure up to six metres in height. The neck of an adult giraffe is about two-and-a-half metres long but it contains the same number of vertebrae as the human neck. The giraffe's long neck and long tongue measuring up to 53 cm help it reach leaves and other food high in the tree-tops. The giraffe calf is about two metres tall at birth-more than the height of an adult human being.



**Important Notice to our Readers,**  
**members**  
**and Contributors of Articles for Cheetal**

1. *The annual subscription to be paid by annual members falls due on 1<sup>st</sup> April of current financial year. Many of our annual members have not paid their subscription for past few years despite repeated requests. Due to apathy of such members the Society is facing great financial hardship. This may kindly be treated as an urgent notice for requesting members to pay the pending dues. this is your society & can run only with your support & sympathy. Members are earnestly requested to clear their outstanding dues even if they have to do it in installments.*
2. *Members & subscribers are also earnestly requested that in addition to annual subsiptions, voluntary DONATIONS may be made to help the society to tide over its financial crisis.*
3. *Many of our regular contributors of articlcs have stopped contributing for Cheetal which is a matter of concern for the Society. Members & contributors of articlcs are requested to send their articlcs along with a soft copy (if possible) to make the journal more meaningful. Members are also requested to motivate & encourage their friends, acquaintances & family members to contribute useful articlcs for Cheetal including articlcs for Young Readers setion, Cheetal quarterly news and your views about the magezin or any particular article or suggestions for improvement. Any old Cheetal article of current relevance may also be suggested.*

*A.S. Negi*



### ***Important Notice***

*Due to increase in printing charges of the Society's Journal, Cheetal, which is supplied free to all category members, we are compelled to enhance the membership fee of the Wildlife Preservation Society as under.*

| <b><i>Kind of member</i></b>       | <b><i>Revised membership fee<br/>(In Rupees)</i></b> |
|------------------------------------|------------------------------------------------------|
| <b><i>Life member</i></b>          | <b><i>2500/-</i></b>                                 |
| <b><i>Institutional member</i></b> | <b><i>400/- per year<br/>3500/- for life.</i></b>    |
| <b><i>Annual member</i></b>        | <b><i>250/- per year.</i></b>                        |
| <b><i>Student member</i></b>       | <b><i>100/- per year.</i></b>                        |

*The revised fee will be applicable to new members with immediate affect. For existing annual members of all kind it will be applicable from 1-4-2007.*

*All members are entitled to a free copy of our Quarterly Journal - Cheetal.*

*The inconvenience highly regretted.*





Phone : 0135-2652410

# THE WILDLIFE PRESERVATION SOCIETY OF INDIA

(Established 1958)

7, Astley Hall, Dehra Dun, U.A.

## APPLICATION FORM

I, .....

hereby

apply to be admitted as a Patron/Life/Annual/Affiliated/Institutional/Student Member of the Wildlife Preservation Society of India.

My interests are .....

Name .....

Designation .....

Address .....

Phone No. & Email .....

Date of Birth .....

### MEMBERSHIP

All Members get Cheetal (Quarterly) Journal FREE

- |    |                                                                                             |                                                      |
|----|---------------------------------------------------------------------------------------------|------------------------------------------------------|
| 1. | Patrons :                                                                                   | Rs.25000.00 and above                                |
| 2. | Life :                                                                                      | Rs.2500.00                                           |
| 3. | Annual :                                                                                    | Rs.250.00 subscription per annum<br>(April to March) |
| 4. | Students (School)                                                                           | Rs.100.00 per annum                                  |
| 5. | Affiliated :                                                                                |                                                      |
|    | (Others similar bodies)                                                                     |                                                      |
| 6. | Institutional                                                                               |                                                      |
|    | (Messes, Units, Schools, Colleges,<br>Govt. Deptts., Corporations,<br>Societies, NGOs etc.) | Rs.400.00 per year                                   |
| 7. | Institutional Life                                                                          | Rs.3500.00                                           |

All Communications may please be addressed to the Hony. Secretary.

Signature

Signature







# The Wildlife Preservation Society of India

## The aims and objects of the Society are as follows :-

To promote interest and impart knowledge regarding the preservation and conservation of all forms of wildlife, particularly among the youth of the country.

To cooperate with the Govt. of India and State Governments and with others Societies and Institutions having similar aims and objects in working for the interests of wildlife.

To assist in enforcing and actively supporting the Forests Acts. Wild Birds and animals Protections Acts and Rules etc. of State Governments and the Indian Arms Act and Rules in so far as they pertain to wildlife and to bring to the notice of the authorities any infringement of the same and to assist in the detention and prosecution of offenders in respect of such laws.

To advise and help the Govt. and wildlife administrators in the formation, maintenance and protection of Sanctuaries and National Parks, preservation of wildlife in general and endangered species of India in particular and in the introduction of exotic species into the country, rehabilitation of endangered species etc. and in the formulation and amendments of rules and acts, so as to conserve and increase wildlife stocks.

To raise funds for carrying out the above aims and objects and to found and maintain museums reading rooms and libraries of natural history in order to disseminate knowledge regarding wildlife.

To carry out publicity and propaganda for the preservation of wildlife in India by means of monographs, journals, films, filmstrips and other feasible methods.

To assist members of the Society in obtaining facilities for viewing and photographing wildlife in India.

To conduct research into the problem of Wildlife management in India, and in pursuance of this, to initiate, encourage and, where possible assist in the projects of the study of threatened species and related objects and to provide reference and research facilities for such work.

To carry on such other activities which will serve the above subjects.

## What membership of Wildlife Preservation Society of India will entitle you to ?

You will become an active member of the growing group of Wildlife enthusiasts, who enjoy working for and spreading the knowledge of how to conserve India's heritage of wildlife for posterity.

You will be entitled to the full use of the library of the Wildlife Preservation Society and of its reading room.

You will receive a membership certificate.

You will receive a personal Identification and Membership Card.

You will be entitled to buy all publications of the Society at a concessional rate.

You will be entitled to buy at concessional rates the Societies Greeting Cards, Calendars, Tie, Label badges and the Balance of Nature Game (specially Published in colour for its educative and recreational values).

You will be supplied "Cheetal", the quarterly journal of the society free.

**For membership particulars write to Honorary Secretary, Wildlife Preservation**



# The Wildlife Preservation Society of India

Working President

Shri N.N. Goel Advocate  
11-A Nemi Road  
Dehradun - 248 001

Executive Vice President

Shri A.S. Negi, IFS (Retd.)  
Advisor (Wildlife) Govt. of Uttaranchal  
300 Model Colony, Araghar  
Dehradun - 248 001

Other Vice Presidents

Shri Ravi Singh  
Secretary General & CEO, WWF- India  
172, B Lodhi Estate  
New Delhi - 3

Shri P.R. Sinha (Ex Officio)  
Director, Wild Life Institute of India  
Post Box 18, Chandrabani  
Dehradun

Dr. B.S. Basfal, IFS  
Principal Chief Conservator of Forests, Uttaranchal  
85, Rajpur Road, Dehradun - 248 001

Shri S. Chandola, IFS  
Add. PCCF & Chief Wildlife Warden, Uttaranchal  
Camp Office-Chandrabani, Dehradun

Honorary Secretary

Shri I.S. Negi, IFS (Retd.)  
12, Sewak Ashram Road,  
Dehradun - 248 001

(Ex Officio) Hon. Asst. Secretary

Shri Narendra Singh  
21/2-3, Teg Bahadur Road No.4  
Dehradun - 248 001

Honorary Treasurer

Dr. S.P. Singh  
9A Sewak Ashram Road,  
Dehradun - 248 001

## Editorial Board

1. Sri. A.S. Negi

2. Sri. I.S. Negi

3. Dr. S.P. Singh